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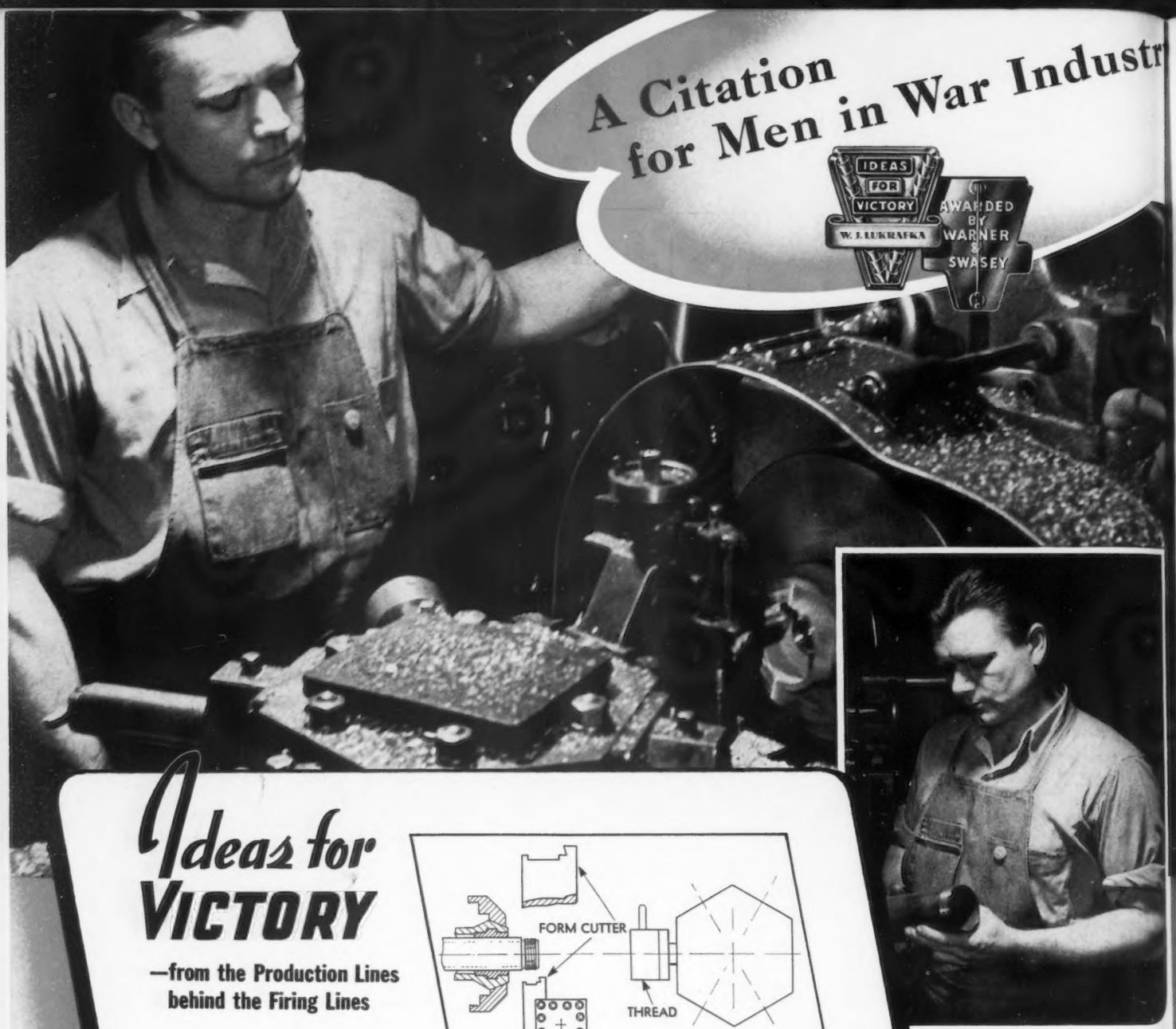
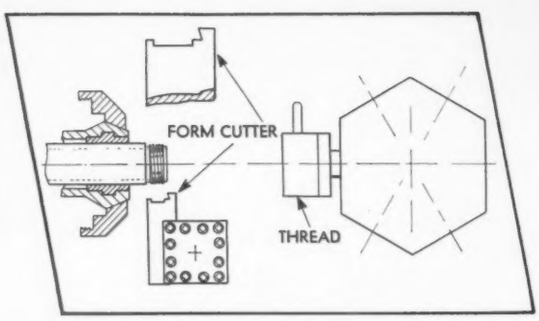


Ideas for VICTORY

—from the Production Lines behind the Firing Lines



He Increased Production 33⅓% by Developing a Forming Tool

Operator W. J. Lukrafka who works for the A. W. Cash Company, Decatur, Ill., was turning a brass tubing job with two knee tools and a die head in the hex cutter and a facing tool in the cross slide.

The sketch shows how by developing a forming tool, he was able to combine the turning and facing cuts into one operation from the cross slide. The die head completed the job. Indexing was eliminated. Time saved! Production stepped up a third!

Many such ideas from patriotic operators are sent to us. In recognition of their initiative and resourcefulness, we are proud to present these men with a gold Victory pin. These "Ideas for Victory" are published in "Blue Chips", a shop bulletin sent free by Warner & Swasey to thousands of turret lathe operators. Make sure your operators are getting "Blue Chips" at their homes. Write Warner & Swasey, Cleveland, Ohio.

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FOR VICTORY

JULY 23, 1942

VOL. 150, NO. 4

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Welded STEEL Machine BASES

Size . . .

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Fabrication of even the simplest machine base requires a high degree of ability and experience if *accuracy* is to be assured. But, when it comes to the big, complicated job—it takes EXTRAordinary skill and equipment. The huge Base, pictured here, is typical of many such intricate designs produced by Mahon, most of which are repeat orders from customers of long standing. But, remember, SIZE makes no difference in Mahon quality—the same excellence of workmanship goes into the building of every Mahon Welded Base—large or small—simple or complicated. If you demand Bases that dovetail in accuracy and quality with the machines for which they are built, let us quote on your requirements. Your blueprints will be figured promptly. Deliveries will be made as promised.

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MAHON

THE IRON AGE

JULY 23, 1942

ESTABLISHED 1855

Spongers

"A SPONGE iron plant at every mine opening;" thousands of tons of sponge iron flowing from these plants into battleships, tanks and guns; additional iron enough to make up for our shortage of scrap and pig iron and thus win the war. That is the vision seen by the eminent Ickes of the Interior and now being presented to Congress. What an entrancing vision.

This picture has considerable background. Sponge iron is not new. For more than half a century, engineers in this country and abroad have pursued this attractive will-o'-the-wisp. For years, The Iron Age has advised would-be investors to steer clear of numerous stock promotion schemes involving the low temperature iron ore reduction process. How many millions of dollars we have saved the innocent by this advice we shall never know.

The best minds of our steel industry have worked on this problem, and millions of dollars have been invested in trying to solve it. And now Secretary Ickes has secured an appropriation of $600,000 which he believes will do the trick.

It is true that Sweden produces some sponge iron. But very little compared with her total iron and steel production. And Swedish ore is a high grade ore, not to be compared with the low grade ores to which this process would be applied in this country.

Germany has low grade ores. And Germany is the mother of "ersatz." For 20 years Germany has been pursuing sponge iron with the result that today she has a metallurgical hangover and two defunct pilot plants. And when the great Goering Works was built, the sponge iron process was conspicuous by its absence.

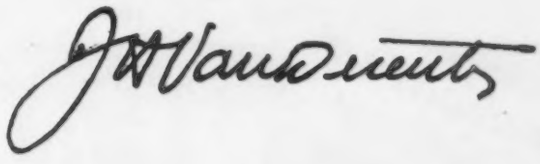
The United States Steel Corp. has also pursued sponge iron, spending over $1,500,000 in so doing. And here is what the Corporation says about it in the authoritative work, "The Making, Shaping and Treating of Steel," by C. B. Francis of Carnegie-Illinois.

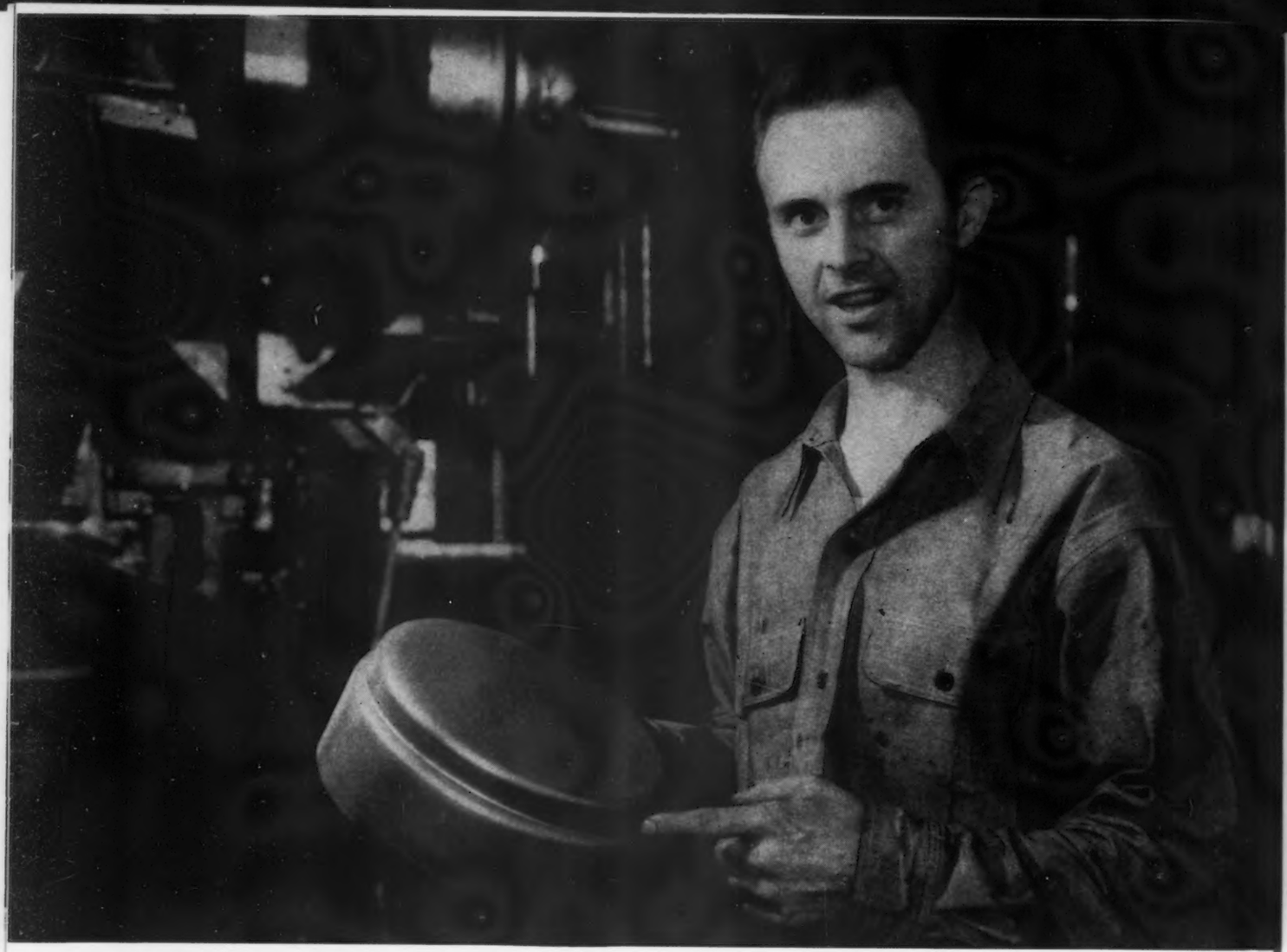
From 1850 and up to the present time, much money has been spent in vain attempts to develop a direct process which would be practical . . . . As practically all of these processes have been abandoned, it is deemed unprofitable to include details of them here. . . ."

Sponge iron as produced, unlike pig iron or scrap, is full of impurities. This necessitates additional refining operations in open-hearth or electric furnaces, all available evidence indicating the need for at least one additional run off of slag in each case. You can imagine how that would slow down the capacity of our existing equipment.

Mr. Ickes estimates that his $600,000 will build two plants, each giving 30 to 50 tons per day. Taking the average of 40, this means an investment of $7500 per ton of daily sponge iron capacity. You can build blast furnaces that will make real pig iron at a cost of $4200 per ton of daily capacity. *And we know they will work.*

Let Mr. Ickes play with his $600,000. If he can do with that what others have spent millions trying unsuccessfully to do, we will take our hats off to him. But until he makes good, let's not throw dollars, hours and tons of material down a knothole in search for imaginary dimes.





How We Cut Excessive Breakage

An Actual Experience—told by an Inland Customer

"We've recently learned a lot about lubrication during deep drawing operations.

"For years we were pretty smug about our practices, believing that our methods were as good as, if not a little better than, the average.

"That was before the war, when wastage was important, but not too important—when we could specify 'tailor-made' steels—when we could stoutly defend our practices and blame failure on the steel.

"Well, that all changed in a hurry when we were betrayed by false Jap diplomacy.

"Suddenly we found ourselves working on new products—war products—made of many kinds of steel. Somehow wastage threatened to get us down. There we were trying to help our fighting men, but production records looked bad. It seems funny now, but we could have been charged with wasting vital steel.

"We had to move fast, and we did. We called in an Inland metallurgist. That fellow was a storehouse of information on lubrication for forming and drawing steel.

"He studied the construction and condition of our dies. He checked hold down pressures. We learned from him the effect of surface temperature generated when drawing. He also had answers on chemical attack on dies, film strength and compounding. His suggestions on the proper application and the frequency of application of lubricants went a long way toward helping us out of our troubles. He also gave us valuable tips on cleaning lubricants from formed parts.

"Here is the end of our story. Wastage almost vanished—production in our shop climbed up, so now we can hold our heads high when there is talk about mass production of equipment for America's fighting men.

"Our advice to you is—*call for an Inland metallurgist.*"

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Fine Tool Finish

Increases Tool Life 2000 Per Cent

. . . Tests made over a period of many months, in which over 100,000 alloy steel forgings were machined, indicate that gains in tool life of 10 to 20 times are possible on high speed steel lathe tools by using a new form of chip breaker groove and finely finishing the cutting faces. Complete details of the method of grinding these tools is given by the authors in this important article.

By CARL J. WIBERG and WESLEY K. HEATH

Production Engineering Department, Wright Aeronautical Corp.

THE present critical shortage of tungsten has made it necessary for many manufacturers to change to molybdenum steels for the greater number of their cutting tools. Some concern has been expressed as to the effect this might have in decreasing production, but the experience of the Wright Aeronautical Corp. has clearly shown that some molybdenum steels give results comparable to tungsten or cobalt high speed steels when properly applied. In fact, some molybdenum high speed steels have proved their superiority on individual applications. The major solution lies in precision machine-ground and honed cutting tools of the proper design.

A program to study the machinability of various metals in actual production has been started, but as a preliminary to those tests, a thorough research was first made in order to develop the most satisfactory tool design for the average rough machining operation on the higher alloy steels. Several tool designs were tried, both with and without chip breakers. For example, a chip curler 1/32 in. deep and 1/16 in. wide with a 1/32 in. land was tried. This groove was ground on the top face right out to the nose and parallel to the cutting edge. This type of groove was difficult to produce effectively and economically without a special set-up for chip breaker grinding, and proved unsatisfactory for breaking up the chips. This same tool without a chip curler or breaker was also tried, but produced unmanageable chips, and shortened the tool life due to increased heat at the cutting edge. As a result of this tool research, a single point cutting tool for many rough turning operations in the Wright shops was produced and will be described later in this article.

Many of the lathe tools in current use were hand ground by the operator (Fig. 1). As it is extremely difficult to hand grind properly, the original tool angles were seldom duplicated whether they had first been ground correctly or not. The machine ground and honed tools as developed produced a much improved tool life, several hundred per cent over operator ground tools. Research on these tools was continued therefore and through these efforts a production method of machine grinding and honing of tools was worked out.

At the same time a series of extensive tests was being conducted on various molybdenum high speed tool steels to ascertain which of the many brands available would give the best tool performance in comparison with tungsten or cobalt high speed steels. To obtain accurate results it was essential that absolute uniformity of tools be maintained, and the two projects were therefore merged into one.

In order to obtain a record of the tool life and performance under actual working conditions, all tools were used on production runs with care exercised at all times. A final and more accurate check of the various tool brands by breakdown tests is being made on several production steels at various speeds and feeds, but the results are not available at this time.

Standard Tool Shape

The tool design as adopted for this research program and used for many rough turning jobs in the shop was as follows: 13 deg. side rake, 5 deg. back rake, 6 deg. front and side clearance, 1/16 in. nose radius, and a step-type chip breaker design adaptable to the application. The chip breaker was ground to the same positive rakes to deflect chips from the point of the tool, and also featured a design with a depth of 1/16 in. and a

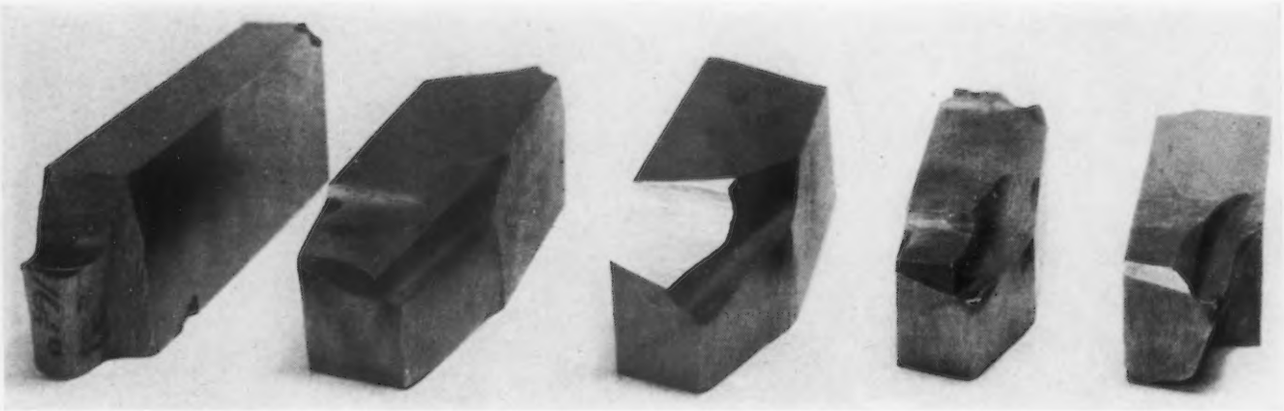

FIG. 1—A variety of hand ground tools used by different operators for the same type of rough turning operation at the Wright Aeronautical Corp. Proper control of tool angles can only be obtained with centralized tool crib control.

1/16 in. shoulder radius on all sizes, but the width and angle of chip breaker was dependent upon many factors, as surface speed, feed, depth of cut, and material. Broadly speaking, the width of the chip breaker at the nose end varied from 7/32 in. on a 1 in. square tool bit to 3/16 in. on a ¾ in. square tool, and 5/32 in. on a ⅝ in tool. These dimensions were not chosen arbitrarily, but were selected on the basis of results obtained in a series of tests. Fig. 2 shows the design of a rough turning tool made from a ¾-in. bit. A group of these machine ground and honed tools is illustrated in Fig. 3.

Advantages of Chip Breaker

The primary object in the use of step-type chip breakers of the proper width and depth was to distribute the force necessary to break the turnings into discontinuous chips which take up less space in the machine pan and give the operator less trouble by eliminating the wrapping of chips around the work. The shear angle of the chip breaker curls back the chip away from the tool point and against the flank of the tool, caus-

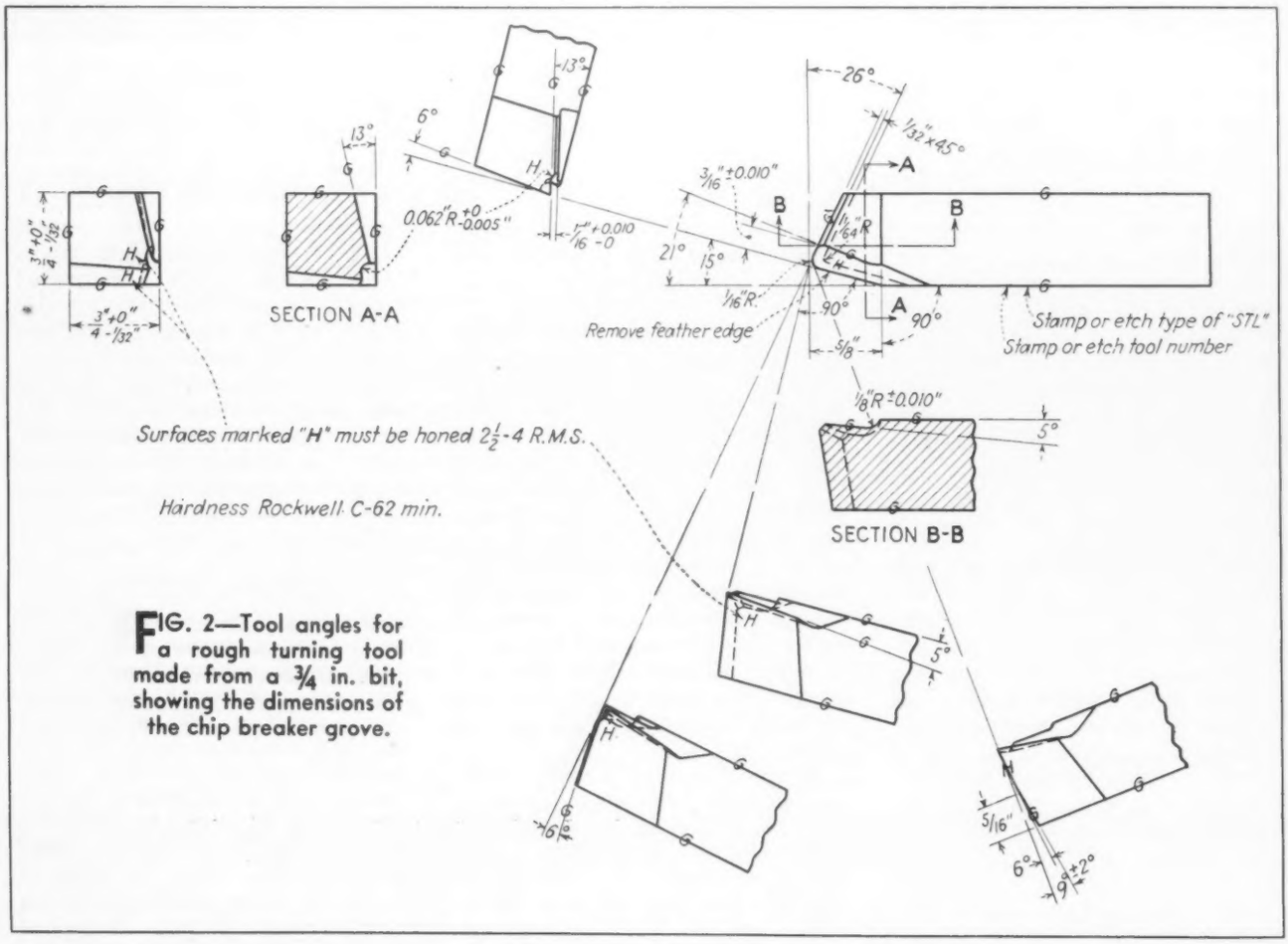
SECTION A-A
SECTION B-B
Surfaces marked "H" must be honed 2½-4 R.M.S.
Hardness Rockwell C-62 min.
Remove feather edge
Stamp or etch type of "STL"
Stamp or etch tool number

FIG. 2—Tool angles for a rough turning tool made from a ¾ in. bit, showing the dimensions of the chip breaker grove.

ing it to break. Furthermore, there is no protracted period of contact between the hot chip and the tool, and consequently less transfer of heat from chip to tool. Additional cooling is also obtained by the fact that the small, rapidly broken chips offer much less obstruction to the flow of coolant over the cutting edge. The removal and disposal of such chips is also facilitated, since they are much more economical to handle.

Tool life and performance are greatly affected by the grinding finish given cutting tools, as may be seen in the accompanying table, which shows the number of pieces obtained per tool grind with hand ground tools and with machine ground and polished tools. The results obtained are apparently due to the keenness of the cutting edge and to the smoothness of the end, flank and chip breaker groove of tool. Under the microscope, the cutting edge appears as an irregular saw tooth edge, which varies in roughness according to the abrasive wheel used and the care exercised in grinding. Fig. 4 shows the appearance under the microscope of the cutting edge of a turning tool as hand ground by the operator. As checked with a Brush surface analyzer the roughness is 20-25 micro-in. r. m. s. Fig. 5 indicates an improved cutting edge due to semi-finished grinding of a machine ground tool, while Fig. 6 is a photomicrograph of a representative cutting edge of a precision ground tool that has been carefully honed to a finish of 1.0 to 1.5 micro-in. r. m. s.

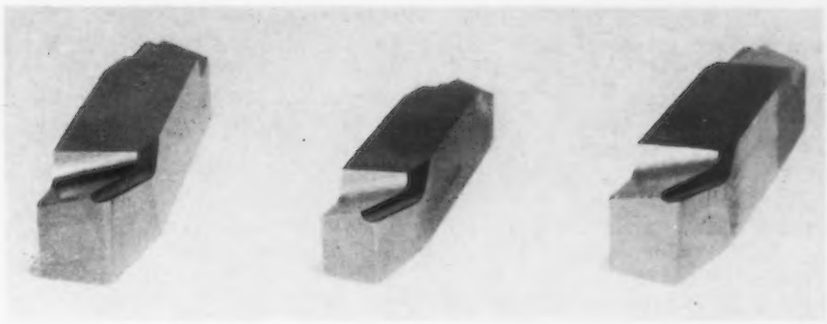

Fig. 3—Machine ground and honed tools of the Wright Aeronautical Corp.

The irregular saw tooth cutting edge particularly noticeable in Fig. 4 produces an uneven flow of metal through the crevices which thereby create localized high stress concentration. This develops a localized heating of the tool point, which increases the rate of breakdown. The resistance to chip flow caused by the roughness of the tool face aggravates this condition, creating an unstable condition in the cutting of the metal. This produces increasing amounts of built-up edge on a tool, and results in a rougher machined surface.

To minimize this effect as much as possible, a method of honing the cutting edge and end was developed. For the tool shown in Fig. 6 a 10x2x2 in. Alundum vitrified wheel (Norton 38220—L9BE) is used. The finishing is done dry on an Ex-Cell-O grinder and requires about 1 min. This wheel is easy to use and does not burn as readily as some others previously tried. While it is easily possible to obtain a smoothness of 1.0 to 1.5 micro-in. with this 220-grit wheel, a finish of 3.0 to 3.5 micro-in. r.m.s. is accepted as satisfactory for the job. Honing time was reduced by grinding the clearance angle to approximately 6½ deg. and then honing only the upper half of the tool flank and end, a procedure that brings this portion of the clearance angle back to 6 deg.

Chip breakers are ground with a positive rake and then polished dry with a fine silicon carbide wheel to a finish of 2.0 to 2.5 micro-in. For this part of the work, the tools are held one at a

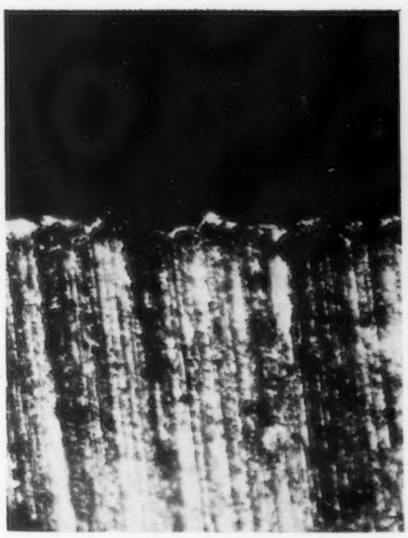

FIG. 4—Enlarged cutting edge of a tool hand ground by a Wright Aeronautical operator. Finish 20-25 micro-in. r.m.s. (Magnification 100 X).

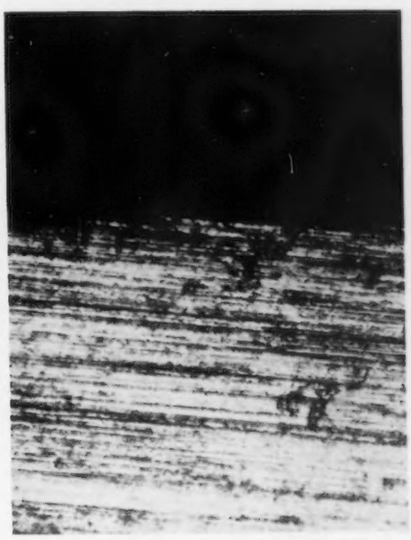

FIG. 5—Enlarged cutting edge of a tool semi-finish ground, but before honing. (Magnification 100X).

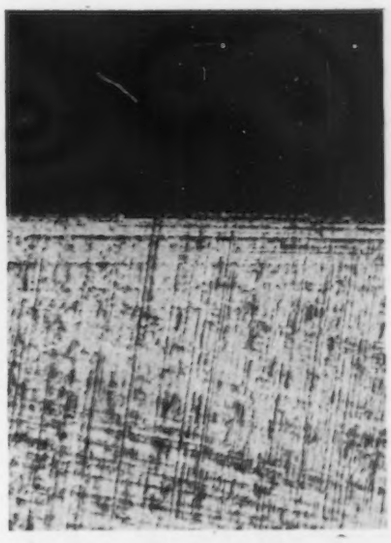

FIG. 6—Enlarged cutting edge of a machine ground tool carefully honed, as now used by the Wright Aeronautical Corp. Finish 1-1.5 micro-in. (Magnification 100 X).

time in a magnetic universal vise on a surface grinder. Very little stock is removed in this polishing operation and care must be exercised in order to avoid burning of the tool or producing chatter marks.

For rough grinding the chip breaker groove a Norton 7 x ½ x 1¼ in. Alundum wheel is used (Norton 3846—18BE). The shoulder radius of 1/16 in. is carefully formed by generating the radius on the edge of the grinding wheel. For the honing or polishing operation on the chip breaker groove, a 7 x ½ x 1¼ in. Crystolon silicon carbide wheel (Norton 37320—J8L) is employed. This wheel removes the rough grinding marks which heretofore were plainly visible. Any burr on the cutting edge is finally removed by slight hand stoning.

Tools are semi-finished ground wet on the flank and end, one at a time, in an Oliver grinder adapted with a specially formed cam or guide which permits the radius and both clearance angles to be ground at one time. The specification of the wheel used for this preparatory work on the tool is a 7 x ½ x 1¼ in. Alundum vitrified wheel (Norton 3846—L5BE).

The project was started in the fall of 1941, and since then over 100,000 pieces of 40 different forgings have been machined using this tool design on about 20 different brands of high speed tool steel. Tests were run continuously on three shifts, seven days a week, without any change in production routine and set-up. Tools were placed on various rough turning operations on both automatic and hand turret lathes. Only rough turning operations have been followed thus far because of the larger amounts of material removed, and the presence of scale which tends to accelerate the wear on the tool.

As stated before, all conditions of tests were kept as uniform as possible. Only H.S.S. tools with a hardness between Rockwell C-61 and C-65 were used. Tools were set on center to axis of the work and at 90 deg. to the cut, experience having shown that tool life is greatly reduced by not keeping tools up on center to the axis of the work. As the tools were ground they were brought back to center by shimming up. On turret tool holders this is not always possible, but modifications of holder designs are planned to take care of this factor. The brand of cutting oil was kept constant as also was the oil flow on individual machines.

A representative part as machined with these tools, and also a sample of the discontinuous type chips produced is illustrated on page 79 in "This Industrial Week."

The production materials used on the tests are carburizing, oil hardening, and nitriding steels, consisting mainly of:

(a) AMS 6250 or SAE 3312, normalized and annealed, Brinell 187-235.

(b) AMS 6254 or SAE 3315, normalized and annealed, Brinell 187-235.

(c) AMS 6290 or SAE 4615, normalized, Brinell 140-190.

(d) AMS 6330 or SAE 3135, heat treated, Rockwell C-26-32.

(e) AMS 6332 or SAE 3140, heat treated, Rockwell C-26-32.

(f) AMS 6470, nitroloy steel, heat treated, Brinell 229-255, Brinell 241-285 and Brinell 290-321.

The proper design of cutting tools has been found to be of primary importance in the machining of metals and there is a marked reduction in power consumption as shown by a recording wattmeter, when the cutting angles are accurately formed. An increase in the side rake angle produces a corresponding decrease in power consumption, but likewise a decrease in the tool life. A thin-edged tool (with small included angle) would cut more easily, generating less friction than a thick-edged tool. However, the cutting edge must be heavy enough to work most satisfactorily at reasonable surface speeds and feeds for the material. It is necessary, therefore, to strike a mean, and for the average ferrous machining jobs, a 13 deg. side rake angle was found to be most suitable.

Precision grinding has been shown to be definitely superior to hand grinding since it permits the tools to be ground in a uniform and consistent manner to definite standards which have been proved by experience and test.

Some of the advantages of machine grinding over hand grinding are as follows:

(a) Establishes definite grinding angles for all tool grinds.

(b) Greatly increases tool life.

(c) Effects great savings in high speed tool steel through reduced regrinds.

(d) Permits the maintenance of a smaller stock of tools.

(e) Minimizes machine idleness, resulting in increased production.

(f) Allows increased surface speeds and feeds without loss of tool life as obtained with hand ground tools.

(g) Improves quality of products.

Substantial savings of tool steel can be made in many cases by using a smaller tool bit. On many of the tests a ¾-in. tool bit, for example, produced more pieces per grind than a 1-in. tool bit, as previously hand ground. It follows, therefore, a 1-in. tool bit machine ground and honed and used on the same job would give a still greater tool life. On the basis of the results obtained, it is possible to establish a definite tool change period for each operation so as to avoid running a tool to complete breakdown. Under these conditions, the bits require but very little grinding to restore them to first class condition, and there is a decided economy of both material and grinding time.

Comparative Lives of Hand Ground Tools and Tools Finely Finished By Machine

Part Name	Material AMS No.	Pieces per grind with hand ground tool	Pieces per grind with test tools
Gear	6250	13	200 to 500
Gear	6250	30	400
Ring	6250	100	150 to 290
Shaft	6250	30	200 to 319
Gear	6250	10	44 to 162
Gear	6250	15	40 to 102
Ring	6250	20	50 to 117
Shaft	6254	15	103 to 200
Gear	6250	18	111
Shaft	6254	8	40
Shaft	6254	8	50
Adapter	6250	1	28

A secondary advantage of precision grinding is that a worthwhile saving is accomplished in the costly grinding wheels themselves, due to the less frequent use, and these can be kept in proper condition by being under the care of direct tool grinding room supervision. This, of course, eliminates the necessity of maintaining a considerable number of grinding stands in the shops. Moreover, it makes possible the production of standard tools in substantial quantities, with consequent reduction in cost. The rough grinding, for example, is now being done in a surface grinder, using fixtures holding up to 18 tool bits at one time, while the finish grinding of the nose radius and clearance angles is done, one tool at a time, using a specially formed cam or guide which permits the radius and both clearance angles to be finished in one operation.

Extreme importance must be attached to the proper method of handling all cutting tools after precision grinding to maintain them in their excellent condition. The cutting edges of the tools must be protected against any possibility of damage between the time of grinding and their being placed in use on a machine. Tools should be carefully inspected, wrapped with Scotch tape or other protector, and then stored in centralized tool cribs until ready for distribution. Centralized tool cribs greatly facilitate the placing of tools on the proper job, sharp and ready for use.

Fine finishing of cutting tools, if carried out in a production manner, can be obtained for a comparatively low cost, and will render an enormous increase in tool life with a proportionate reduction in tool cost per unit machined.

Qualitative Test for Molybdenum

IN these days of hustle in machine shops it sometimes happens that a lot of molybdenum steel becomes mixed with a quantity of 18-4-1 high speed steel. If the pieces are finished to size, it becomes imperative to determine their identity without grinding them in a spark test. The laboratory of the Jones & Lamson Machine Co. has long sought such a test. Failing to find one, the company developed a procedure which is reported to be satisfactory if the steel contains at least 0.20 per cent molybdenum.

The test is a modification of the quantitative, colorimetric test now commonly used for the determination of molybdenum in steel, and is based on the orange colored compound formed from the quinquevalent molybdenum ion by the reaction with sodium sulfocyanate, after reduction with stannous chloride. With these requirements in mind the following spot test was devised:

(1) A small piece of filter paper is placed on a clean section of the steel to be tested, and three drops of 1-1 nitric acid are placed on the filter paper.

(2) After allowing the acid to react for a moment, the paper is rolled onto a glass rod and transferred to a medium sized test tube.

(3) One ml. of perchloric acid is placed in the test tube and after shaking for a few seconds, 10 ml. of distilled water is added.

(4) One drop of sodium sulfocyanate is added to the test tube and the contents shaken until the deep red color which develops, becomes uniform. The sodium sulfocyanate solution consists of 50 gm. of NaSCn per liter.

(5) Eight drops of stannous chloride are next placed in the tube and the contents shaken until the solution becomes colorless. Sometimes an extra drop or two may be necessary to render the solution colorless, but an excess must be avoided. The stannous chloride solution is made by dissolving 32 grams of $SnCl_2$ in 40 ml. concentrated HCl by warming slightly; then diluted to 100 ml. by adding cold distilled water.

(6) Ten more drops of sodium sulfocyanate are now added to the tube and the contents shaken for a few seconds. The development of a deep orange color shows the presence of molybdenum. Smaller quantities of molybdenum result in a lighter shade, and if the sample contains no molybdenum the solution remains colorless. If the sample is a molybdenum high speed steel, the solution turns to a bright red color after standing for 15 min. This test is sensitive only to about 0.20 per cent molybdenum.

168-Hr. Work Week for Machines

• • • The Spence Engineering Co., Walden, N. Y., uses the set-up shown below to secure a 168-hr. week on its machines. The numbers in the squares are the seven men who operate the two machines. The relief man is indicated in bold face. Spence Engineering has found that 48 hr. a week is about all a man can stand. Furthermore, not enough skilled men are available for a 40-hr. week, and the men usually want the 8 hr. overtime.

MACHINE		DAY						
No.	Time	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
1	7 a.m.—3 p.m.	**32**	44	44	44	44	44	44
	3 p.m.—11 p.m.	37	**32**	37	37	37	37	37
	11 p.m.—7 a.m.	22	22	22	**32**	22	22	22
3	7 a.m.—3 p.m.	39	39	39	39	39	39	**32**
	3 p.m.—11 p.m.	63	63	**32**	63	63	63	63
	11 p.m.—7 a.m.	36	36	36	36	**32**	36	36

Soaking Pit and Reheating Furnace

IN earlier types of soaking pit, the side walls were generally straight and unbroken except for the fire boxes at one end and the flues at the other. In more recent designs, for example the Salem type, the walls are circular and are broken at regular intervals by burner blocks, as in Figs. 9 and 10. There is still some difference of opinion as to just what expansion allowances are required in building furnace walls, but it would at least appear certain that the amount that gives the most satisfactory result is less than that which would be expected from purely theoretical consideration of the expansion of the hot face of the brickwork.

With gas or oil-fired reheating furnaces, the walls are broken at frequent intervals by burners, each of which has its own burner block. This is often of a superior quality material compared with the remainder of the side wall.

Materials:

In general soaker and reheating furnace side walls are constructed of medium alumina brick, but low and high alumina refractories are also employed and give satisfactory service. Table III gives the properties of eight bricks that have been found to give good results. It will be seen that they show a wide variation in properties, the melting point varying from 2822 to 3200 deg. F. The use of the very refractory brick, F. 27 is a question of local economics rather than operating conditions, the clay from which it is made being mined close to the steelworks and the bricks being available at a cost competitive with that of lower grades brought in from farther afield. The first six bricks in Table III are more typical of normal practice. It will be noticed that most of these show a tendency to bloat when refired for 2 hr. at 2552 deg. F. They have a fairly high bulk density and a

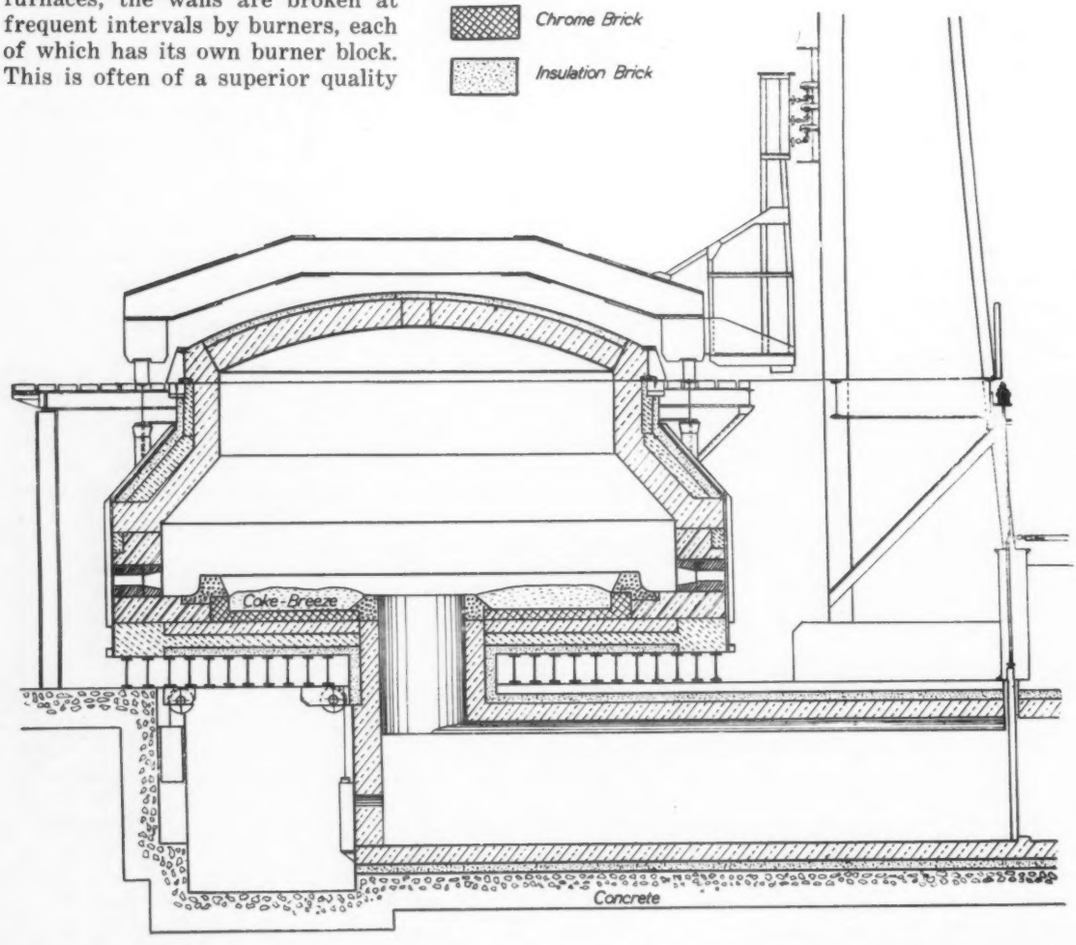

FIG. 9—Circular soaking pit. (Courtesy of Salem Engineering Co., Ltd.)

Refractories

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. . . Concluding the study of soaking pit and reheating furnace refractories, the author discusses the refractories used in the construction of furnace side walls, hearths, and flues.

fairly low permeability to air with the exception of F. 15, which is a cheap, wire-cut brick that does not give as good service as the others.

Their thermal shock resistance varies from as low as 9 to as high as 30+ reversals. The use of this type of brick in soaker side walls offers certain advantages, notably their tendency to bloat, giving tight joints, and to take a glaze. Whether insulation is used behind the walls is also largely a question of local conditions. Thus, if as is unfortunately too often the case, the ingots tend to impact on the walls, then walls are better not insulated since if they are they do not possess the same rigidity. On the other hand, in a well designed rectangular pit, insulation is quite practical and an undoubted fuel economy will result. Hite and Soler mention a figure of 8.5c. per ton of ingots, the insulation being paid for in 10 weeks.

In the United States considerable use is made in soaking pits of a micaceous sandstone, commonly known as "firestone" which can be cut into large blocks. At first sight it would appear probable that the use of this material, essentially a raw quartz, would lead to spalling trouble, but if this does occur it is not severe enough to make its use uneconomic.

When the ingots are exposed to the atmosphere and the high temperature of the soaking pit they inevitably scale to some extent, a loss of about 2 per cent by weight being typical. The molten scale so formed drips onto the hearth and in many soaking pits accumulate to a depth of several inches. The effect of this molten iron oxide on both the side walls and the hearth can be reduced to some extent by placing coke breeze or calcined dolomite, onto it, but the attack is usually severe enough to warrant the use of special refractories at this level in the side wall.

In the past, either magnesite or straight chrome brick have been used, but more recently chrome-magnesite or chrome-silica bricks have been employed with considerable success. The properties of the magnesite, chrome and chrome-magnesite brick have already been discussed in earlier articles on the open hearth furnace.

Those of the chrome-silica brick are given in Table IV. The use of these bricks, which were first developed several years ago in Great Britain by Rees and Lynam, has been largely limited to the washline in soaking pits, where the results obtained have led to their continued use. They represent a compromise between the properties of silica and chrome brick which depends upon the fact that little, if any, reaction occurs between the two main constituents. Thus, the thermal shock resistance, which is approximately 12 reversals, is of the same order as that of chrome brick and markedly higher than that of the ordinary silica brick, while the refractoriness under load is low compared with that of silica brick. Unless some such course is employed to withstand the attack by the molten scale, the firebrick walls rapidly become undercut, and tend to fall in.

The side walls of reheating furnaces are generally constructed of medium alumina brick, the type given as F. 2 in Table II being frequently employed. It will be seen that this is a dense brick of good crushing strength, high thermal shock resistance, reasonable volume stability and a melting point of about 3056 deg. F. For the burner blocks, more refractory material is usually specified, the quality being similar to that described in the United States by the terms "super-duty" or "high heat duty" fireclay brick, whose definitions are given in the Manual of A.S.T.M. Standards on Refractory Materials. The super-duty quality has a pyrometric cone equivalent value of cone 33 (3173 deg. F.) or over, while that of the high heat duty is over 31 (3056 deg. F.).

The super-duty brick must also show an after contraction of less than 1 per cent and a spalling loss of less than 4 per cent in the specified tests. For very special work, sillimanite burner blocks are employed, typical properties of this material being given in Table IV under the code No. X. 14. It will be seen that these sillimanite brick are not only dense and strong, but show negligible length change on refiring for 2 hr. at 2732 deg. F., have a thermal shock resistance of 30+, and a refractoriness under load, 50 lb. per sq. in., of 3200 deg. F.

Excellent as these test results are, they do not give a fair impression of the usefulness of the sillimanite brick. Its resistance to thermal shock is considerably greater than that of most of the best fireclay brick, while its maximum safe temperature is much higher. Like fireclay brick, it is subject to fairly rapid attack by molten scale, but contrary to the opinion frequently expressed, its resistance to ferruginous slags is usually greater than that of, say, a 42 per cent alumina fireclay brick. The one serious factor preventing its more general use is its high price, which is of the same order as, though somewhat less than, that of most basic refractories.

The end walls of reheating furnaces are usually just doors. The refractories used for bricking them

vary widely with the precise conditions existing in the furnace. Where these are not particularly severe, light-weight doors constructed from high temperature insulating brick are sometimes used, but medium or high alumina firebrick are more commonly employed. Doors can also be constructed by ramming insulating or refractory concrete into a door frame either with or without reinforcing, while lids made in this way have also been used with success on soaking pits.

The technique in preparing such refractory concretes has been discussed by Hussey and other authors referred to in the bibliography at the end of this article. In general, a firebrick or high temperature insulating brick grog is first soaked in water and then mixed with about 20 per cent of Ciment Fondu together with sufficient additional water to give the necessary hydraulic set. After standing for a day, the doors are hard and may be dried out prior to use. In many installations, doors of this type are preferred because of the ease with which the material may be rammed to fill a complex frame that would present a comparatively difficult problem to the brick mason.

In the continuous slab heating furnaces, the refractory pillars supporting the water cooled skids have given a great deal of trouble because of the difficulty of finding a brick that combined high refractoriness under load with good spalling resistance. Super-duty semi-silica and high alumina brick have all, according to Hite and Solar, been used quite successfully, but at some plants recourse has been made to water cooled U-supports.

Causes of Failure:

Ideally, ingots should not rest on side walls nor fall against them during charging. In practice they often do, and account must be taken of this in the initial construction. Thus it has been found advantageous to insert five courses in the side wall a few feet from the top, each course being stepped in one inch in order that the middle course projects several inches into the furnace. When the ingot falls against the wall, it is this course that takes the brunt of the impact rather than the wall as a whole. Furthermore, this protrusion keeps the ingot off the wall during removal.

The actual life obtained depends on many factors, for example; the rate of drive of the furnace, whether coal or gas firing is employed, and how often the soaking pit is cooled off in order that scale can be removed from the hearth. With some soaking pits this latter process is far too vigorous, water being employed to cool off the slag with inevitable damage to the side walls by thermal shock and steam. With coal-fired soakers, the arch over the fire box is exposed to high temperatures and coal ash and hence the life may be short even when high alumina fireclay brick or silica brick are employed.

In the ordinary reheating furnace, working at say 2192 deg. F., the wear is slight and a side-wall life of a year or more is not unusual. In such furnaces, the charge rarely comes into contact with the walls and the atmosphere is generally quite clean. As might be expected, furnaces operating continuously or with a slow heating and cooling schedule show markedly longer lives.

Lines of Improvement:

Here again the possibility of improved life seems to be as much a matter of design as of material. Where walls show instability, small changes in design, for example, from a straight wall to a slightly convex one, may avoid loss of shape; while in extreme cases some type of tied-in construction such as is employed for suspended roofs might well prove worth while.

The Hearth

Construction and Materials:

If the hearth temperature is high, 2192 to 2372 deg. F., and there is considerable scaling, a monolithic top hearth is often preferred, particularly if the charge is pushed over the hearth and tends to grip and dislodge any brick whose edges protrude even a small amount above the general level. Several courses of material are often employed. In soaking pits the hearth may consist of a monolithic section of perhaps plastic chrome, resting on a medium alumina fireclay brick course, which in turn rests on in-

TABLE IV

Properties of Miscellaneous Soaking Pit and Reheating Furnace Side Wall and Door Bricks

Type:	Chrome-Silica Soaker Slag Line Brick		Medium Alumina Door brick	Sillimanite Burner and Hearth brick
Code No.:	X.1	X.2	F.5	X.14
Apparent porosity, per cent	29.5	27.5	23.0	23.8
Bulk density gm. per c. c. lb. per cu. ft.	1.95 122	2.06 129	1.98 124	2.33 146
Apparent specific gravity	2.77	2.84	2.58	3.06
Crushing strength, on end, lb. per sq. in.	1360	1950	4110	3380
Permeability to air, c.g.s. units, perpendicular, 9x3 in., 1 skin	2.13	1.93	0.0086	0.025
After contraction 2 hr. at 2570 deg. F.	−0.1 (Exp)	−0.1 (Exp)	−4.8 (Exp)	−0.05 (Exp) (2 hrs. 1500 deg. C.)
Pyrometric cone equivalent (Seger)	29 3002 deg. F.	20–26 2858 deg. F.	>30 Over 3056 deg. F.	n.d.
Refractoriness under load Maintained temperature, 25 lb. per sq. in. 1 hr. 2552 deg. F.	0.3 per cent collapse	failed in 57 min.	....	....
Rising temperature, 50 lb. per sq. in. Initial softening Rapid softening Fail temperature	....	....	2084 deg. F. 2300 deg. F. 2624 deg. F.	2732 deg. F. 2876 deg. F. 3200 deg. F.
rmal shock resistance	12	13	30+	30+

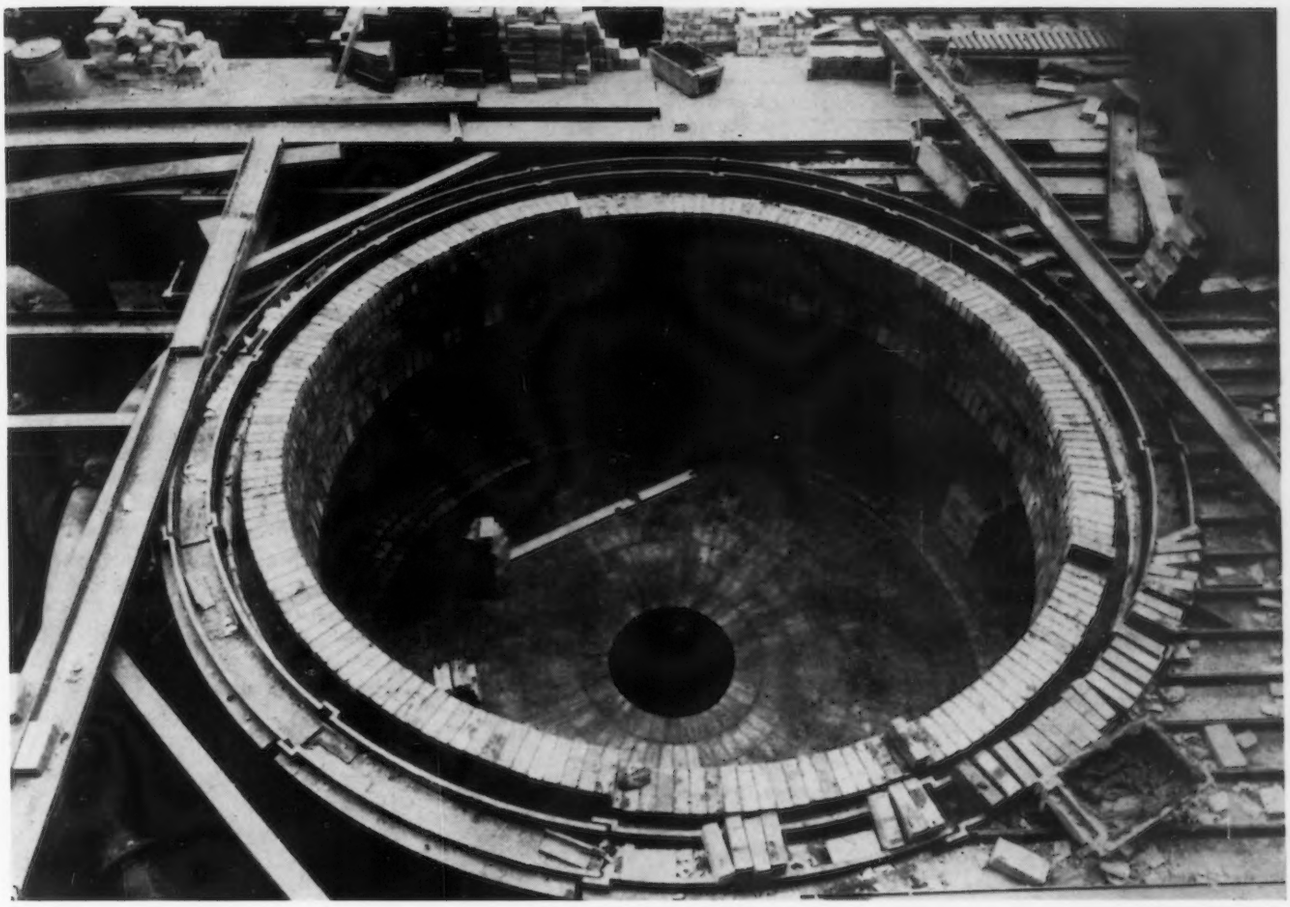

FIG. 10—Circular soaking pit under construction. (Courtesy of Salem Engineering Co., Ltd.)

sulating brick or concrete. Coke breeze is often used on top of the plastic chrome to absorb some of the molten scale and prevent ingots sticking to the hearth. Another type of construction employs a monolithic hearth of basic calcined dolomite resting on a sub-hearth of either chrome or stabilized dolomite brick. In some soaking pits it is considered more economical to build the hearth of a low grade fireclay brick and to renew it as frequently as required.

In reheating furnaces, a firebrick hearth is usually adequate and this generally rests on a layer of insulating brick or concrete. If, however, the temperature is sufficient to result in considerable scaling, then a basic hearth is more economical. Attempts have been made to heat billets to forging temperatures on fireclay hearths, even in continuous furnaces, but the results have often been disastrous with a furnace which should have run for several months having been put out of action in a few days because the slag from the billets had bitten into the hearth until it looked like a ploughed field. Where this severe attack occurs, recourse must be had to a basic or neutral hearth such as can be made with magnesite, chrome magnesite, or stabilized dolomite brick. The peculiar shapes of such hearths, such as is in the circular "tunnel kiln" type furnace, make it easier and cheaper to use a chrome plastic.

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Fortunately materials are available that will do this job quite satisfactorily. There are two main types. The first consists essentially of chrome ore ground in a pan mill with a small amount of water-glass and sometimes other bonds such as clay; while the second consists of chrome or a chrome-magnesite mixture bonded with about 20 per cent of Ciment Fondu. The first type bricks are supplied in sealed tins under a number of brand names and simply require to be placed on the hearth and tamped into position. Since they contain water glass, which tends to form a skin on drying, considerable care must be taken in venting the hearth or the steam formed during drying and heating-up will cause disruption of the working face. Such venting can conveniently be done by pricking the surface at intervals with a pointed rod. The Ciment Fondu type of material is supplied in the dry condition and is mixed with a suitable amount of water, usually about 8 per cent, and rammed in position on the hearth. In carrying out such ramming, which is also done with other hearth mixtures such as chrome, magnesite, sulphite lye, and iron borings, the use of wooden shuttering is essential since otherwise the material tends to flow under the rammer and good compacting is not obtained.

The Ciment Fondu hearth can be dried out at a rapid rate after it has had 24 hr. in which to set, and yields an excellent hearth for use in contact with scale. With both types of material, the proper grading of the batch is a first essential, and this may be obtained either by sieving out and re-mixing the constituents or by controlled pan milling. One type of grading found to give excellent results is the 45 per cent coarse, 10 per cent medium, and 45 per cent fine type grading already referred to in connection with induction furnaces.

A position in which the chrome plastics have given excellent service and in which, at present, no adequate substitute appears to be available, is the finishing zone in the triple fired two-zone continuous type slab reheating furnace, referred to in the introduction and illustrated in Fig. 8. Here the large slabs at a temperature suitable for rolling are pushed off the water-cooled skids in the preheating zone on to a chrome plastic hearth. This latter is therefore subjected not only to contact with scale but also to severe abrasion. In spite of the difficult operating conditions, good chrome plastic will withstand a through-put of 600 tons of slabs per day for periods of a year or more.

For certain special purposes, such as the reheating of stainless steel sheets, where any reaction between the brick and the metal has a deleterious effect on the final finish, sillimanite is sometimes used. Its principal advantage is that a higher temperature is required than with firebrick before reaction with dry mill scale occurs.

Causes of Failure:

The greatest difficulty with the soaking pit hearth is the removal of the molten scale which drips from the ingots. Many soaking pits are fitted with a tap hole through which the molten scale should be drained, but in some plants this is never used because the superheat on the scale is insufficient to permit of efficient drainage and the tapping arrangements are for from ideal. It has been found that drainage from fireclay hearths can be facilitated by charging crushed semi-silica or sand fireclay bricks onto the hearth prior to use.

The molten scale reacts with this to form a very fluid material, a result which might have been predicted from a study of the $FeO.Al_2O_3$-SiO_2 diagram, the lowest melting points in which are obtained when about 10 per cent Al_2O_3 is present. At other plants the soakers are periodically shut off and after cooling with water the "bulldog" or fused scale is broken up and taken out. It is undeniable that such a procedure has a bad effect on the life of the soaking pit refractories, but some method of removing the scale has to be employed and in any case the "bulldog" finds a ready market which compensates to some extent for the damage done.

With reheating furnaces operating at low temperatures, the hearth presents no serious problem although it does ultimately have to be renewed due to abrasion by the charge. With furnaces operating under conditions in which the scale is molten or pasty, a problem exists which is still far from solved. The scale losses are of the order of 1 to 2 per cent even in the most modern type of furnace, and a proportion of this scale adheres to the hearth forming an extremely dense and tough layer. This soon builds up to an inconveniently great height and in most furnaces of this type some method of descaling the hearth is employed, often during a week-end shut-down.

The result, from the standpoint of the refractory manufacturer, is most unsatisfactory since no matter how well his refractory has withstood attack by molten scale, it may be badly damaged during the removal of the adhering layer. There is considerable difference of opinion as to whether brick or chrome plastic is least damaged by this process, and doubtless these differences depend on real differences in operating conditions. It can only be stated here that for some furnaces better results are obtained with chrome plastic than with, say, chrome or chrome magnesite brick, while with others the opposite is true.

Lines of Improvement:

The outstanding problem therefore as regards the hearth is the method of removing or preventing the adherence of molten scale from the ingots or billets. The present methods represent an unsatisfactory compromise and it would be better to work with a really fluid slag which can be efficiently tapped off, or to employ some device to enable hard scale to be removed without damage to the hearth below. Thus, in recent reheating furnace trials it has been found that stabilized dolomite brick can be protected by a ½ in. layer of "basic" which is brushed off the hearth as soon as it becomes slagged with scale.

Flues

It might be anticipated that flues, which frequently contain reducing gases and which are built from common firebrick, would be subject like the brick in a blast furnace stack to disintegration by carbon deposition. If any such disintegration does occur, it must be on a very slight scale since the life of even a low or medium alumina fireclay brick in this position is generally a matter of years.

Both soaking pits and reheating furnaces may be equipped with a regenerator or recuperator system so that the sensible heat in the exit gases can be recovered to preheat the incoming air. Where regenerators are used, they are essentially similar in type to those employed with the open hearth furnace and may even be fitted with slag pockets. The conditions governing the selection of the refractories are also similar and will not therefore be re-discussed. It should, however, be pointed out that the temperature of the exit gases is in general far below that of an open hearth furnace and that there is a much lower concentration of dust in the atmosphere. Hence, a considerably longer life may be expected than is obtained with open hearth furnace checkers.

Recuperators may be built of a variety of materials, the main aim being to recover waste heat by passing the exit gases through tubes or hollow tiles to the chimney flue and bringing in the air for preheating over the outside of these tubes, generally in a direction at right angles. With soaking pit recuperators, hollow fireclay blocks are often used together with tiles, but considerable use has been made with reheating furnaces of recuperators built with either silicon carbide or metal tubes. The high conductivity of silicon carbide brick, about 10 times that of fireclay, and metal make for very efficient heat transfer. The utility of silicon carbide in the steelworks is at the moment limited, but its peculiar properties make it extremely suitable for this particular purpose.

In addition to this high conductivity, it has a very high refractoriness under load and can be made with a very low permeability. It has been stated that even at 2462 deg. F. its compressive strength is of the order of 10,000 lb. per sq. in. Furthermore, it shows an unusually high thermal shock resistance. All these properties mark it out as a material peculiarly suitable for recuperator construction. The standard tube developed for this purpose is 4 ft. 4 in. long, and has an external diameter of 5.75 in., and an internal diameter of 4.10 in. Cylin-

drical fireclay rods, known as "core busters," are placed in the tubes to give high turbulence of the gases and thus promote efficient heat transfer.

It is said that reheating furnaces equipped with recuperators possess a number of advantages over a regenerative system and in particular enable a much more constant temperature to be maintained. It is clear that if the preheated air can be supplied at a fixed temperature, then both fuel and atmosphere control will be much easier.

Acknowledgment

In conclusion, thanks are expressed to Dr. T. Swinden, director of research, for permission to publish this article; the publicity department of the United Steel Companies Ltd., the M. H. Detrick Co. Ltd., and the Salem Engineering Co. Ltd., for supplying illustrations, and numerous friends in the steel and refractories industries for their constant assistance.

Bibliography

Exclusive of reference included under sections dealing with "Materials"

General:

Q. Bent., Journal of Iron and Steel Institute, 1938, 138, 11, 397.

H. Etherington, "Modern Furnace Technology," Charles Griffin & Co., Ltd., London, 1938.

F. T. Havard, "Refractories and Furnaces," McGraw Hill Book Co., Inc., New York, 1912.

A. Hermann, "Industrial Furnace Technique," Ernest Benn, Ltd., London, 1929.

E. C. Hite, and G. Soler, *Brick and Clay Record*, 1940, 96 (1), 62. 1940, (3), 57.

O. Inman, and H. A. Wainwright, *British Steelmaker*, 1939, 5, 277.

W. A. Morton, *Iron and Steel Engineer*, Jan. 24, 1938, 15.

C. L. Norton, Transactions of Electrochemical Society, 1939, 75, 123.

U. A. Peters, *Rolling Mill Journal*, February, 1931, 5, 109.

A. Shack, "Industrial Heat Transfer," John Wiley & Sons, Inc., New York, 1933.

McDowell J. Spotts, and L. L. Gill, *Steel*, 1938, 102, (17), 42 and (20), 48, 55.

W. Trinks, "Industrial Furnaces," John Wiley & Sons, Inc., New York, 1934.

H. T. Watts, *Steel*, June 17, 1935, 96, 30.

Soaking Pits:

Anon., *Steel*, July 18, 1936, 103, 66.

R. A. Fiske, THE IRON AGE, Dec. 3, 1936, 138, 52.

F. M. Gillies, and E. D. Martin, Journal of Iron and Steel Institute, 1938, 138, 11, 319.

A. L. Hollinger, *Steel*, March 22, 1937, 100, 41.

S. M. Jenkins, *Steel*, March 9, 1936, 98, 64.

E. Longenecker, *Blast Furnace and Steel Plant*, 1937, 25, 995.

M. H. Mawhinney, *Iron and Steel Engineer*, April, 1936, 13, 6, and June, 1936, 13, 26.

G. R. McDermott, *Iron and Steel Engineer*, June, 1935, 12, 369.

W. A. Morton, *Steel*, Dec. 13, 1937, 101, 44 to 48 and 80.

W. J. Rees, and T. R. Lynam, Transactions of Ceramic Society, 1936, 35, 138 and 153.

Coal Ash Attack:

K. Endell, R. Fehling, and R. Kley, Journal of American Ceramic Society, 1939, 22, 105.

R. Fehling, *Feuerungstechnik*, 1938, 26, 33.

C. R. Fettke, and W. E. Stewart, Carnegie Institute Technical Cooperative Bulletin on Mining and Metallurgical Investigations, No. 73, 90, p. 1936.

A. H. Moody, and D. D. Langan, *Combustion*, 1935, 6, (8), 13.

Refractory Concrete:

A. A. Chadeyron, and W. J. Rees, Refractory Materials Joint Committee of Institute of Gas Engineers, 28th report, 1937, 76.

J. G. Coutant, *Blast Furnace and Steel Plant*, 1937, 24, 1142.

A. V. Hussey, *Chemical and Industrial Metallurgy*, 1937, 56, (3), 53.

W. M. McGrue, *Blast Furnace and Steel Plant*, 1937, 25, 624.

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Portable Spray Booth for Aircraft

A SPECIAL portable Binks spray booth, made specifically for this operation at the Ryan Aeronautical Co. factory, is equipped with an exhaust system to carry away the spray and fumes while painting the interior of training plane fuselages. The booth may be moved down the fuselage production line, or the fuselages on their "move jigs" can be brought to the special spray unit.

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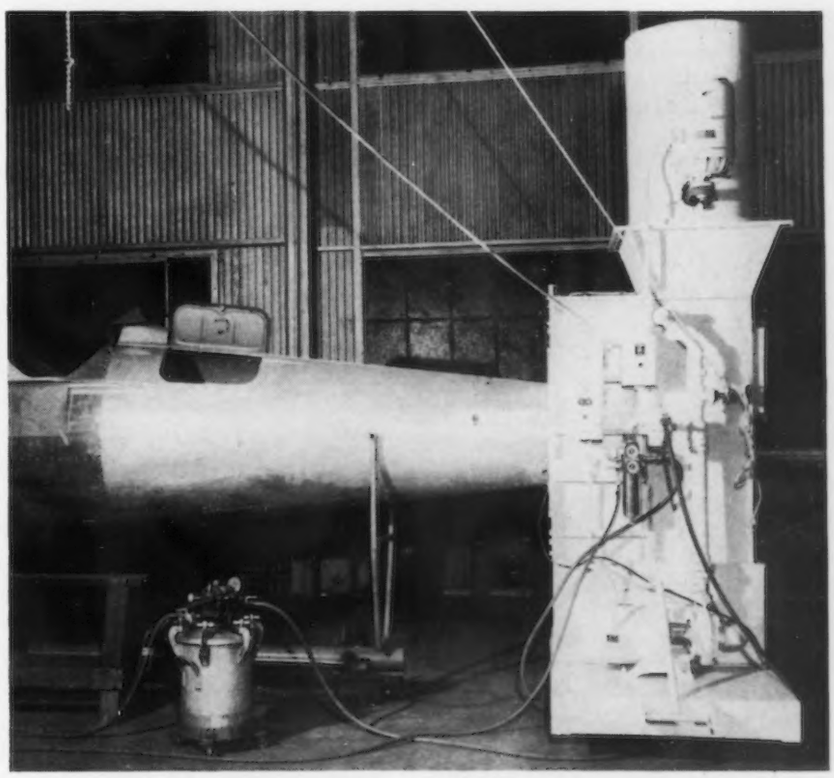

Advances in Electric Welding of Tubes

By D. A. JOHNSTON
Product Development Engineer, McKay Machine Co.

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THE requirements of the war program for large quantities of steel tubing have naturally stimulated interest in improved methods of producing tubing of all types. Electric resistance weld mills with their adaptability for producing a large range of tubing sizes, particularly those with diameter and wall thickness below the capacity of seamless mills, are advantageous when seamless mills are working to capacity and unable to meet all requirements.

The expiration of the basic patents on electric resistance weld methods in 1938 has tended to stimulate development of newer types of machines embodying improvements leading to higher mechanical and electrical operating efficiency, particularly as to the methods of conveying the welding current to the point of contact of the welding electrodes and the tube.

Older types of welders ordinarily employ stationary transformers, necessitating the use of rather long flexible leads from the tranformer to the point where the high amperage current could be transferred to the welding electrodes by means of brushes. In the original Par-part machines, the bearings supporting the electrode roll shafts, on the other hand, were the point of entry of the welding current to the electrodes. These designs were recognized as being inefficient due to current losses, and required high maintenance because of inability to maintain good bearing surfaces, since adequate lubrication prevented passage of uniform welding current.

The most efficient method of bringing the current to the welding electrodes is by rotating the transformer and electrode rolls on a common shaft with the current being carried to the primary side of the transformer by means of a commutator and brush at high voltage. On the secondary side, the current is then carried through a copper sleeve on which is mounted one of the electrode rolls. The return circuit is formed through another electrode roll mounted on another copper sleeve insulated from the first. The entire transformer and electrode roll assembly rotates on anti-friction bearings, as a unit, the speed of rotation being entirely controlled by the pressure against the tube as it is fed from the forming mill. This method has been used for years but a recently patented design employs these essentials plus the added feature of accessibility for changing of electrode rolls. This design also permits use of a transformer of the proper kva. rating for tube wall thickness regardless of electrode roll diameter.

It might be mentioned that the efficiency at the welding point of the rotary transformer illustrated is from 92 to 95 per cent. The power factor is over 90 per cent.

Electric weld mill operators agree that the success of such a mill is dependent to a very large degree on the correct forming of the strip material preparatory to welding, but no two such men seem to agree on what the correct method of forming should be. In the writer's opinion the following factors should govern in the design of the roll passes to produce the proper shape preparatory to welding:

(1) Sufficient roll passes to allow the material to take a natural flow, minimizing distortion and edge wrinkles.

(2) Sufficient number of side roll idle passes to assist in even flow of material between main driven passes and to prevent scrubbing of the material over the flanges when entering the main roll passes.

(3) Adequate guiding to hold feed of strip in a straight line, thus helping to maintain the seam cleft without wavering. This factor also is of great assistance in entering a new coil of stock, making it possible for the new coil to thread itself through the roll passes without manual assistance.

Welder Unit

Convenience in raising and lowering the rotary transformer and electrode assembly described above has been achieved by the addition of motor operated raise and lower mechanism, with hand-wheel for accurate setting. Motor drive is provided for rotating the electrode shaft when dressing the electrode rolls to the correct profile at the

welding point. Suitable seam guide rolls and pressure rolls are standard equipment with adequate adjustments to handle the conditions encountered. There is also provided a tungsten carbide flash trimmer tool with cam operated quick raise and lower device and supporting rolls.

Gradual water cooling is provided to prevent hardening at the seam. The cooling tube is also used as a guide to enter the front end of the tube into the first sizing pass. Three driven and three idle sizing passes permit tube to be correctly sized and straightened before entering the flying cutoff. The drive to the sizing and straightening stand is such that speed compensation for the elongation of the tube (due to sizing) can be made. Since material for this mill is in the form of coil stock, it is necessary to cut off the welded tube to the proper lengths without stopping production and with minimum scrap losses.

Earlier machines cut off the tubing by means of hand operated saws as the operator walked along with the tube and pulled the saw through. This method creates a highly objectional burr. There have been numerous machines made using a blade or die type cutoff with the tube held in a suitable confining form during the passage of the blade through the tube. The greatest objection to this type of equipment is that the point of entry of the blade causes an indentation and the ends necessarily had to be re-cut. Furthermore the blade life is very short.

The ideal method of cutting off tubing is to give the equivalent of a lathe cut and hold sufficient accuracy of length to be within commercial tolerances. The equipment illustrated was designed with these objectives in mind. The method of obtaining the proper type of cut is by maintaining the correct surface speed at point of contact with the tube and by correct hydraulic feed of the cutting tools. Automatic air operated clamps hold the tube rigidly on either side of the cut and materially assist in sustaining the quality of the cut and also allow outside edges to be slightly chamfered. The correct surface speed is obtained by adjustment of the variable speed motor to suit the tube diameter. Accuracy of lengths is determined by the relative position of stock gage and the cutting tools. Automatic dumping arms are provided to clear the machine for the oncoming uncut tube. The carriage holding the cutting head moves on a track on anti-friction bearings and is carried along by the tube itself, the end of which contacts the gage head so that no difficulties of speed synchronization can occur.

The equipment is capable of producing tubing to closer tolerances than commercial practice, both as to diameter, concentricity and length. It was purchased primarily for the manufacture of boiler tubing, and can be used also for mechanical tubing and conduit within range of its capacity.

Cap Your Welding Rod

USE each rod down as far as practical . . . no stub over 2 in. should ever be thrown away. *Save* stub ends for tacking. Remember, a discarded 2-in. stub from a 14-in. rod means about 14 per cent waste. Most deliveries take six weeks to six months . . . even with high priorities, so help save rods wherever possible.

CAP your rods! Weld down to a minimum stub, then ground your next rod and cap it with the stub in your holder. It takes 3 sec. for the weld to cool, then you can resume welding. The added cap permits the use of the entire coated surface of the next rod. (Avoid burns by grasping the new rod well away from the capping.)

CAPPED rods have two advantages: First, they conserve vitally needed material and second, they permit welding in hard-to-get-at places because the cap may be applied at any angle. This method can be applied to any type of rod. In most cases, there is a saving of one rod in every seven.

Photographs by courtesy of Joseph T. Ryerson & Son, Inc.

Short Cuts in Drilling and Welding

Lockheed and Vega are cutting production time with these welding and drilling practices. Lockheed manufactures the twin-engined P-38 and the Boston bomber; Vega is building Ventura bombers for the R.A.F. and B-17F Flying Fortresses for the U. S. Army Air Force.

WELDERS at the Lockheed plant work on small parts clamped to a turntable which they rotate with their feet. At the welder's right is an automatic torch lighter which allows him to turn off the torch without touching the regulating valves on the handle. A small flame relights the torch when it is picked up. In back of the welder are gages on common gas lines. The lines are fitted with water traps as a protection against gas backfire.

ORDINARY work benches were formerly used in Vega's shearing, routing and forming department for this drilling operation. The awkward angle required on the tool places a strain on the operator, particularly where girls are employed. Another view on this page shows how the operation was simplified.

o o o

LEFT

A SPECIALLY constructed drill bench takes the kink out of the operator's arm. Note that the drill is held in a more natural position, giving the girl a better view of the work. This tends to reduce operator fatigue, a factor which inevitably retards production and increases rejects.

Chemical Finishes for Aluminum Alloys

o o o

. . . For surface protection of aluminum base alloys Light Metals, London, in the issue of February, 1942, discussed the use of chemical rather than electrolytic processes. Surface treatments by such methods are fast and economical.

FOR imparting the highest qualities of corrosion resistance to aluminum and the majority of aluminum-base alloys, finishing by anodic oxidation is by far the most important process. For the successful carrying out of this electrolytic treatment, however, generating equipment or some equivalent is required, and while this in itself need not necessarily be complicated, at the same time it is not always available and may entail difficulties in installation.

Quite apart from this, consideration of economic factors involved will show that it is not easy to set up a plant capable of handling what might be termed miscellaneous work, ranging in size from small castings to massive frameworks, and from pure aluminum to more or less complex alloys demanding very careful supervision during the treatment.

For much of this work it may prove more satisfactory, in the light of service requirements, to adopt, instead of anodic oxidation, one of the chemical immersion processes. For these, existing tanks may, as a rule, be more readily adapted than for electrolytic treatment. It thus becomes of paramount interest to examine the corrosion-resisting properties of films produced by the chemical processes. The anodic oxidation process may be employed, given suitable electrolytes, to a number of other metals, including such widely different materials as tin and tantalum; while protection by chemical immersion or dipping is certainly applicable to virtually every metal and alloy.

To revert to immersion treatment of aluminum alloys, the subject will be considered first from the operational aspect; secondly, with respect to surface appearance produced, and, finally, by comparison of degrees of corrosion resistance imparted.

The simplest aqueous immersion treatments for general use contain sodium or potassium chromate as the effective chemical. Actual composition of solution, concentration, operating temperature and immersion period vary somewhat from process to process. A sound formula uses 4 per cent by weight of potassium chromate (6 to 7 oz. per gal.), with treatment taking place for 30 min. at boiling point. The inclusion of sodium carbonate in the mixture rather improves the degree of corrosion resistance secured, as well as enabling shorter immersion periods to be employed.

Thus, a mixture of 5 per cent anhydrous sodium carbonate and 1½ per cent anhydrous sodium carbonate (8 oz. and 2½ oz. per gal. of water, respectively), operated short of boiling, gives very satisfactory results when the work is immersed for periods as short as 3 to 5 min.

For some rather obscure reason, potassium chromate appears to produce better results than the corresponding sodium salt, and one process has been established, making use of the following details:

Anhydrous sodium carbonate	8 oz.
Potassium chromate	3 oz.
Distilled water	1 gal.
Operating temperature	Gently boiling.
Immersion period	10 to 15 min.

It was on work treated by this process that the tabulated test data were obtained. These alkaline chromate solutions are the basis of the modified Bauer-Vogel, or MBV process.

Fifty-first in a series of articles on the technical and commercial aspects of metal finishing and cleaning.

Cleaning and Degreasing Systems

As for all metal-finishing processes, work for chemical treatment must be in a thoroughly clean con-

TABLE I—Comparison of Aluminum and Aluminum Alloys, Sheet, Rod, Tube and Foil, with and without Chemical Treatment, Under Saltspray Tests at Ordinary Temperatures

Sample No.	Material	Chemical Pre-Treatment	Period of Exposure to Salt Spray in Days					
			1	7	14	21	35	56
1	0.040-in. aluminum sheet, hard	None	Virtually unaffected	Very light general attack, more marked along rolling lines	Attack general but still very light	Slight pitting becoming evident	Pitting more marked	White corrosion general but not deep. Pitting general but not severe
2	0.040-in. aluminum sheet, half hard	None	Virtually unaffected	Very light general attack, more marked along rolling lines	General slight attack and slight pittings	Further development of attack still slight	Pitting general but not deep	General white corrosion and pitting but still not deep
3	0.040-in. aluminum sheet, soft	None	Unaffected	Very slight evidence of corrosion	Only very light general attack	General corrosion still light, more marked along rolling defects	Slight pittings evident	Light general corrosion, a few heavier patches and a little pitting
4 to 15	Aluminum sheet in 3 tempers as samples 1, 2, 3	(a) MBV (b) MBV and silicate seal (c) Soda satin and MBV (d) Soda satin, MBV and silicate seal	Unaffected	Unaffected	Unaffected	Unaffected	Unaffected	Unaffected
16	0.003-in. aluminum foil	None	Slight evidence of attack	Very light general whiteness	General light corrosion	Little further attack	Tendency to pitting and pinholing	Slight general attack but considerable pinholing
17	0.003-in. aluminum foil	MBV	Unaffected	Unaffected	Unaffected	Unaffected	Unaffected	Unaffected
18	0.040-in. Duralumin sheet	None	Slight general surface attack	Attack heavier and some pitting	Corrosion rather heavy, pitting deep and dark discoloration	Further development of attack	Corrosion very heavy and pittings deep	Condition very poor
19 to 22	0.040-in. Duralumin sheet	(a) MBV (b) MBV and silicate seal (c) Soda satin and MBV (d) Soda satin, MBV and silicate	Unaffected	Unaffected	Unaffected	Unaffected	Corroding to white deposit along edges	Slight further deterioration
23 24	0.003-in. Duralumin foil	None MBV	Rather heavy attack	Pitting and pinholing	Condition poor, corroded, ragged edges, pinholes and some larger corrosion holes. Test discontinued.	—	—	—
25	0.040-in. aluminum-silicon-alloy sheet, hard	None	Very slight surface staining	Some evidence of pitting but corrosion still slight	Pits numerous but corrosion not heavy	Further development of attack	Pitting and depth of attack more marked	Condition rather poor, corroded and pitted
26	0.040-in. aluminum-silicon-alloy sheet, half hard	None	Very slight surface staining	Very slight general attack and a little pitting	Fair degree of general corrosion, pitting not extensive	Further development of attack	Pitting and depth of attack more marked	General corrosion heavy, pitting rather bad; condition poor
27	0.040-in. aluminum-silicon-alloy sheet, soft	None	Very slight surface staining	Slight general corrosion, much pitting	Fairly heavy general corrosion and numerous pits, some deep	Further development of attack	Pitting and depth of attack more marked	Condition very poor, very heavy corrosion and pitting
28 to 39	Aluminum silicon sheet in 3 tempers as samples 25, 26 and 27	(a) MBV (b) MBV and silicate steel (c) Soda satin and MBV (d) Soda satin, MBV and silicate seal	Virtually Unaffected	Virtually Unaffected	A few tiny corrosion spots and a few local areas of slight attack	Little further deterioration	Rather more general slight surface corrosion and pits developing	General surface corrosion, still slight and pits not so numerous or deep as Samples 25, 26 and 27
40	1¼-in. aluminum silicon hexagon rod	None	Exceedingly slight attack	General slight attack and numerous black points of corrosion	General corrosion, fairly heavy	Increasing corrosion	Further deterioration	Corrosion generally very heavy with much pitting
41	1¼-in. aluminum-silicon hexagon rod	MBV	Unaffected	Virtually Unaffected	General slight whitening	A few heavy local corrosion patches	Gradually increasing corrosion	Corrosion fairly heavy, pitting not extensive
42	1-in. interior 1¼-in. exterior diameter aluminum silicon tube	None	Very slight general attack	Increase in attack, heavy inside	Further increase in attack	General corrosion rather heavy	—	Very heavily corroded, condition poor
43	1-in. interior, 1¼-in. exterior diameter aluminum-silicon tube	MBV	Unaffected	Unaffected	General slight attack, rather heavier inside	Progressive deterioration	—	Fairly heavy corrosion but superior to No. 43
44	⅛-in. 2 per cent magnesium-alloy, sheet	None	Slight surface corrosion	Small increase in depth of attack	Fairly heavy white corrosion and numerous pits	Deterioration progressing	—	Very heavy surface corrosion and much pitting
45	⅛-in., 2 per cent magnesium alloy, sheet	MBV	Unaffected	Unaffected	One point of slight attack	Little change	The one point of corrosion developoping	One patch of corrosion, otherwise unaffected
46	⅛-in., 7 per cent magnesium alloy	None	Very slight surface effect	Very slight superficial corrosion	Fairly heavy white corrosion and numerous pits	Further deterioration	Corrosion rather heavy generally	Corrosion and pittings heavy, condition rather poor
47	⅛-in., 7 per cent magnesium alloy	MBV	Unaffected	Unaffected	Unaffected	Unaffected	Unaffected	Very slight corrosion at edges
48	0.003-in., 7 per cent magnesium-alloy foil	None	Slight superficial attack	Marked corrosion and pitting	Fairly heavy corrosion, pitting and pinholing; condition poor	Test discontinued	—	—
49	0.003-in., 7 per cent magnesium alloy	MBV	Unaffected	Unaffected	Unaffected	Unaffected	Unaffected	Slight corrosion at edges
50	0.062-in., 1¼ per cent manganese-alloy, hard sheet	None	Unaffected	Very slight evidence of corrosion at edges	Light attack in isolated patches, a few blisters appearing	Little further deterioration	Attack still relatively slight, but blisters developing	General deterioration not heavy but many blisters and a few pits
51	0.062-in., 1¼ per cent manganese-alloy, hard sheet	MBV	Unaffected	Unaffected	Unaffected	Unaffected	A few blisters showing	A few blisters, a little corrosion at edges, but in general unaffected
52	0.003-in., 1¼ per cent manganese-alloy foil	None	Unaffected	General slight corrosion, some heavy patches and a few tiny holes	Fairly heavy corrosion, blisters and ragged holes	Test discontinued	—	—
53	0.003-in., 1¼ per cent manganese-alloy foil	MBV	Unaffected	Unaffected	Unaffected	Unaffected	A few blisters appearing	No real corrosion but a few blisters apparen

dition. All oil and grease, drilling and tapping lubricants, press greases, finger marks, loose dirt and swarf, incidental corrosion products, must first be removed. The usual processes are applicable. Generally, trichlorethylene vapor, or liquor-vapor treatment is sufficient, taking care of oil or oil and swarf. In addition a mild alkaline cleanse, for example, a mixture of 2 oz. each of soda ash and sodium meta silicate per gal. operated short of boiling, is desirable if soluble oil, or soap press greases be involved.

For treatment in the chromate solution, work is handled on jigs or racks, wires or hooks, or in baskets, according to its nature. No difficulty is encountered in wetting the work because of the alkaline nature of the solution, but it is evident that for uniform and complete processing, all surfaces of the articles must be presented to the solution. This factor must be borne in mind when designing the carriers, and if small articles such as screws, nuts and washers be treated in baskets, they must be lightly shaken during immersion in order to free all surfaces for reaction. After treatment, work is washed thoroughly in cold and hot waters, and then dried off by air blast, oven, or by virtue of its own heat.

Tanks for the MBV solution are fabricated by welding from mild steel. Baskets, racks and fixtures can also be of steel. Edge exhaust from the top of the tank to remove steam is convenient.

A word of advice is necessary in connection with edge exhaustion of chromate-laden fumes and spray. For tanks more than 18 in. wide, it is to be recommended that exhauster slots be placed at least along both long edges of the tank, and for wider tanks, along all four edges. Precautions taken with chromate solutions cannot be made too stringent. A suction fan of adequate power should be provided for fume exhaustion.

Process control is obviously simple. Evaporation must be compensated by additions of distilled water to maintain a constant level. Chemical concentration can be controlled by periodic analysis and with the appropriate additions. More frequently, however, a test piece of pure aluminum sheet is periodically passed through the solution to ascertain by visual appearance that the desired finish is obtained in the specified time. When this fails, the solution is scrapped and a new one prepared. Something of the order of 50 sq. ft. of work surface per gal. of solution can be processed.

The process data discussed have included merely precleaning, but no preparatory treatment for the metal itself. Without the latter, the finish reveals all the blemishes that existed from the outset, namely, rolling and drawing marks, defects and blemishes such as spills and indents and incidental scratches in articles from rolled, drawn or extruded stock, and fettling, riser and flash defects in castings. These can be eliminated to a greater or lesser degree when appearance is of importance according to the standard of perfection imposed.

The usual polishing methods apply with added precautions to avoid flowing the metal to cause greasy inclusions, and preferably finishing with dry compound. High polish, rough polish, or polish followed by abrasive graining can all be employed. Further, a reasonably uniform finish can be obtained by lightly blasting with abrasive. Again, much can be done from the appearance viewpoint by a chemical "satin" treatment. For this, the cleaned work is immersed for 20 to 30 sec. in a hot solution of caustic soda (1 lb. per gal.), then thoroughly washed in water, and immediately immersed for a few seconds in cold nitric acid (1 volume commercial concentrated acid, 2 volumes of water). Thorough water washing follows.

The MBV finish can be improved for some purposes by including another immersion operation in the process line. This uses a solution of water glass (sodium silicate), concentration 8 oz. per gal., temperature 194 to 212 deg. F.), and immersion time 10 to 15 min. It follows immediately after the water rinse applied subsequent to the chromate treatment. After silicate treatment, thorough washing is required.

The silicate treatment is somewhat comparable to the sealing operation that follows anodic oxidation. Its chief influence upon the film is that of hardening and reinforcing the chromate coating to improve its resistance to ordinary wear. In specific instances of service exposure, it adds to corrosion resistance.

Of the several proprietary processes, the Pyrene Co.'s "Pylumin" method can be exemplified. The operation of this meritorious process is closely similar to that cited for the MBV method. The solution is prepared from proprietary chemicals (12 oz. per gal. of water) and the correct operating conditions maintained by periodic analysis, comprising a simple alkalimetric titration. In this way the strength of the solution can be kept at constant level by regular chemical additions. The solution is operated gently boiling and the immersion time can be from 3 to 10 min. Thorough final rinsing in cold and hot waters is necessary.

The type of tank required for the pyluminizing solution is a simple one of mild steel with preferably internal heating by iron or steel steam coils, or, if necessary, external direct gas burners.

The pylumin process may be regarded as a commercial development from the MBV process, very amenable to shop manipulation and close control, and yielding consistently uniform results. It is very suitable not only for providing corrosion protection in itself but also for serving as the basis for lacquer, paint and enamel coatings.

Influence of Alloys

The visual appearance imparted by the chromate treatments is dependent not only upon the surface condition of the work, but also upon the composition of the alloy. Specific results from the MBV treatment, with or without silicate seal, and with and without "satinizing," will now be summarized.

Aluminum itself, of commercial purity, responds very well indeed, yielding a lustrous finish slightly gray in color. The 7 per cent magnesium alloy showed an increase in luster and a tendency to iridescence. The 2 per cent magnesium alloy gave a lustrous finish having a pleasing dark gray color. The finish on duralumin tended to be matte and to reveal a mother-of-pearl effect, or to darken slightly. The 10 per cent silicon alloys became a dark gray, dull, and in some cases having a loose superficial film.

Test results on specimens finished by different processes are summarized in appended tables. These specimens cover several of the commoner aluminum alloys in sheet, rod or tube form, and in a variety of tempers. They also cover light alloy castings.

The test itself comprised one of the standard salt spray tests, namely, exposure to the spray produced by atomizing 20 per cent salt solution with compressed air. The atmosphere was produced in a closed cabinet in which the specimens were obliquely positioned for the full day, although spray was actually operating only for the 8-hr.

TABLE II

Comparison of Aluminum Alloy Castings, With and Without Chemical Treatment under Saltspray Test at Ordinary Temperatures

Sample No.	Alloy	Chemical Pre-treatment	Period of Exposure to Salt-spray Test in Days			
			1	7	14	21
54	Aluminum-silicon alloy	None	Slight attack evident, generally more heavy at some points	Fairly heavy corrosion general	Very heavy general corrosion, depth of attack appreciable. Condition poor Test discontinued	—
55 to 58	Aluminum-silicon alloy	(a) MBV (b) Satin and MBV (c) MBV and silicate seal (d) Satin, MBV and silicate seal	Unaffected	Virtually unaffected	Virtually unaffected	A number of corrosion spots in pores or crevices, otherwise unaffected. Condition very good
59	Aluminum-silicon-copper alloy	None	Fairly heavy corrosion general	White and discolored corrosion products general, considerable pitting. Condition poor, depth of attack appreciable. Test discontinued	—	—
60	Aluminum-silicon-copper alloy	MBV	A few tiny white corrosion spots evident	Slight increase in number and size of points of attack	A little further deterioration	Corrosion still mainly confined to isolated spots, depth of some of which was appreciable, but general condition quite good
61	Aluminum-silicon-copper alloy	Proprietary chemical treatment	A few tiny white corrosion spots evident	Some increase in number and size of points of attack	Slight further deterioration	Corrosion largely confined to isolated spots and pits, with general condition quite good

working period. Once a day the specimens were removed, washed in flowing water and dried.

Table I is a summary of typical test results on the wrought forms; it is self-explanatory. In the case of aluminum, samples 1 to 15, the benefit of the treatment is clearly established. This is most emphatically demonstrated in the case of the heavily rolled foil material, samples 16 and 17, this normally being more prone to deteriorate due to higher local stresses, especially at pin points where dust or grit is rolled-in.

The merits of treatment are also shown with duralumin, samples 18 to 22, although not so markedly, but not with the examined specimens of duralumin foil (samples 23 and 24). Similar conclusions can be drawn from the silicon-alloy sheet specimens, 25 to 39, and rod and tube, samples 40 to 43. The magnesium (samples 44 to 49) and the manganese (samples 50 to 53) alloys, in sheet and foil forms, all show marked benefits from the treatments.

In Table II are given test results on castings in the "as received" condition, with the casting skin only disturbed by fettling, drilling and tapping. The results are self-explanatory, but some comments are warranted. The behavior of the aluminum-silicon alloy is rather peculiar. The untreated casting (sample 54) in Table II deteriorated more rapidly than the wrought specimens in Table II but the treated castings (samples 55 to 58) in Table II withstood the test conditions at least as well as the treated wrought samples. The copper-containing alloy castings (sample 59) showed up rather less favorably, and when treated (60 and 61) revealed improvement, but to a lesser degree than in the case of the straight silicon alloy. For information, analytical data upon the various specimens tested are given in Table III.

TABLE III

Analytical Data Appertaining to Aluminum and Aluminum Samples Tested Under Saltspray. Average Values.

Sample Nos.	Alloy	Composition, Per Cent				
		Silicon	Iron	Manganese	Magnesium	Copper
1 to 15	Aluminum sheet	0.19	0.43	Trace	Nil	Nil
16 and 17	Aluminum foil	0.15	0.29	Trace	Nil	Nil
18 to 22	Duralumin sheet	0.52	0.41	0.48	0.47	4.54
23 and 24	Duralumin foil	0.38	0.32	0.23	0.43	4.68
25 to 39	Aluminum-silicon-alloy sheet	10.3	0.36	Trace	Nil	Nil
40 and 41	Aluminum-silicon-alloy rod	9.8	0.29	Trace	Nil	Nil
42 and 43	Aluminum-silicon-alloy tube	9.5	0.42	Trace	Nil	Nil
44 and 45	Magnesium-alloy sheet, 2 per cent	0.27	0.19	0.10	1.57	Trace
46 and 47	Magnesium-alloy sheet, 7 per cent	0.35	0.27	0.15	6.35	Trace
48 and 49	Magnesium-alloy foil, 7 per cent	0.36	0.60	0.36	6.85	0.11
50 and 51	Manganese-alloy sheet, 1¼ per cent	0.32	0.33	1.30	Nil	0.02
52 and 53	Manganese-alloy foil, 1¼ per cent	Trace	0.37	1.22	0.64	Trace
54 to 58	Aluminum-silicon-alloy casting	14.1	0.90	0.02	Nil	Trace
59 to 61	Aluminum-silicon-copper-alloy casting	5.5	2.1	0.05	Nil	2.3

Disadvantages of Hard Water

One important point concerning the MBV process is worthy of note. If the normal main water supply is relatively hard, it is found that the finish tends to be more patchy, generally duller and often to have a number of irregular white patches. This is apparently due to precipitation of lime and its loose absorption on the surfaces of the work. It is considered that this not only detracts from the appearance of the finish but also diminishes its effectiveness as a protective coating. The trouble is overcome by using distilled water or by a suitable mixture of main water and distilled water. A typical analysis of a hard water that gave this trouble is given in Table IV, in which distilled water is also illustrated for comparison.

Regarding the chemicals used for the MBV process, sodium or potassium chromate can in normal times be readily obtained in a high degree of purity, so that ordinary commercial forms are suitable. The anhydrous sodium carbonate is the commercial soda ash of minimum 98.0 per cent purity normally used for water softening. The water glass used for sealing is preferably one having a high ratio of silica to soda. A typical quality is shown in Table V.

To those accustomed to the serviceability of anodically treated aluminum alloys, the chemical treatments may appeal as inefficient and superfluous. To those who

TABLE IV

Comparison Between Hard Main Water and Distilled Water

	Main Water	Commercial Distilled Water
Hardness values:		
Total hardness, deg.	16.7	Nil
Temporary hardness, deg.	10.0	Nil
Permanent hardness, deg.	6.7	Nil
Total solid residue, grains per gal.	27.3	0.5
consisting of:		
Calcium carbonate	10.0	
Calcium sulphate	6.0	
Magnesium chloride	2.5	
Magnesium sulphate	1.5	
Sodium chloride	3.5	
Iron and aluminum oxides	0.1	
Silica	1.5	
Organic matter	2.2	

cannot apply the electrical methods, they must appeal as very attractive. Undoubtedly they have their place in the finishing sphere, and they are sound within the limits mentioned. Moreover, the expense of anodic oxidation is often not justified, or its undisputed merits not fully required in service.

The chromate treatments are rapid and manipulable. The pylumin type of process is foolproof and consistent, and admirably suited to the finishing shop that treats a miscellany of work through a variety of finishing treatments. On aluminum, aluminum-manganese and aluminum-magnesium alloys it is extraordinarily effective and attractive. On more complex and less corrosion-resisting alloys, e.g., silicon and copper-silicon types, it is still effective. Further, simple, quickly executed finishes such as one and two coats of cellulose enamel that have doubtful adhesion when applied directly upon aluminum alloys, and age rather rapidly to brittle films, adhere better, and retain adhesion and flexibility quite well upon chromated surfaces.

The appreciation of chemical finishes is borne out by the extensive technical and patent literature. Some of the most interesting work has been carried out by W. Helling and H. Neuneiz.* They studied the inclusion of sodium silicate actually in the sodium carbonate-chromate solution of the MBV process, with particular reference to obtaining clear transparent films not only upon aluminum itself, but also upon the alloys that normally give gray colored coatings.

**Aluminium (Germany), 1938, 20, 436.*

Apparently this is a question of slowing down the rate of attack by the presence of the optimum amount of sodium silicate. Large amounts inhibit the action altogether, so that no protective film results, while an insufficient amount does not reduce the action of the soda to the necessary degree. The optimum concentration recommended corresponds to 7½ oz. sodium carbonate and 2¼ oz. sodium chromate per gal. with as little as 0.010 to 0.016 oz. of dry sodium silicate added. The precise amount of silicate required is determined by quality of the chemicals, but particularly by the hardness of the water and grade of silicate employed. The customary 10 min. immersion at 194 to 212 deg. F., holds good, and a 15-min. treatment in 2 per cent sodium-silicate solution may follow. Work carried out in this country confirms that appearance is improved by this procedure.

TABLE V

Laboratory Characteristics of Commercial Water Glass

	Sample No.	
	(1)	(2)
Specific gravity at 59 deg. F.	1.62	1.44
Water content, per cent	55.0	59.8
Sodium-Silicate content, per cent.	45.0	40.2
Consisting of:		
Soda content as Na_2O, per cent	13.0	11.5
Silica content, as SiO_2, per cent	32.0	28.7
Ratio of silica to soda	2.5	2.5

Hollow Drill Speeds Micro-Sampling

CONSIDERABLE time can be saved in extracting solid test samples from castings, forgings, rolled material and welded parts by using a tubular drill. It is usually possible to sample the material without weakening the part being tested, and the specimen lends itself easily to mounting in plastic specimen blocks. The method replaces the slow and laborious procedure commonly used of sawing out specimens for microscopic analysis.

The method, used by Westinghouse Electric & Mfg. Co., East Pittsburgh, utilizes a tubular drill having a number of cutting teeth at one end. The drill has a removable centering device consisting of a pin and spring arrangement inside the hollow shaft. Held in the chuck of an ordinary stationary or portable air, electric, or hand drill, no jigs are required and the drill is operated in the conventional manner.

A pilot hole about ⅛-in. in diameter and ⅛-in. deep is first drilled in the part to be sampled with a standard twist drill. The tubular drill is then clamped in the chuck with the spring and centering pin inside the drill. The centering pin is positioned to extend beyond the drill teeth and the nipple is inserted in the pilot hole. When the tubular drill has cut into the piece about 1/16 in., it is withdrawn to permit the pin and spring to drop out. Drilling is then resumed to the desired depth, and the solid core formed inside the tubular shaft of the drill is removed from the drilled part by flexing it until it breaks off at the base.

AFTER drilling a pilot hole with an ordinary twist drill, the spring and centering pin, placed in the hollow drill guides the hollow drilling. Upon removal of the pin and spring, the hollow drilling is continued until the desired sample is obtained. Samples may be mounted as shown in the test blocks in the photo.

. . . Dry Machining of

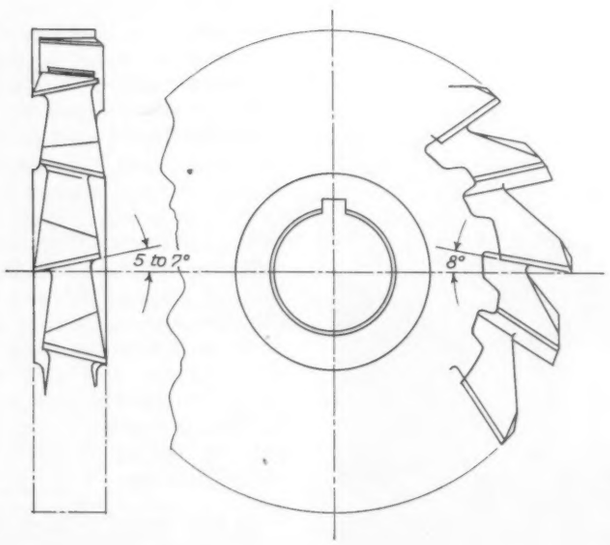
By H. MILLS GARNER
F. A. Hughes & Co., Ltd., England

° ° °

A STUDY of British and American practice in machining magnesium alloys reveals a marked dissimilitude. American production engineers frequently employ a liquid coolant designed to maintain the tool and work temperature below the ignition point and quench sparks which might otherwise be expected to ignite the finely divided metal.

The practice of dry machining magnesium alloys is universal in England except in a very few instances and a definite trend in this direction is developing in the United States today. Dry machining enables the operator to take full advantage of the excellent machinability of the metal and, equally important, realize far greater value from clean, oil-free swarf (chips) due to the higher recovery obtainable in melting.

Owing to the phenomenally free cutting qualities of magnesium alloys it may be said that the higher the cutting speed, the better the results. Higher cutting speeds than those permissible for any other metallic substance, may be employed with these alloys. The low cutting pressure required and the high thermal conductivity of the metal results in a rapid dissipation of the heat generated by the cut and prevents overheating of the cutting tools. The use of maximum cutting speeds permits marked reduction in machining times, a factor of incalculable value to the high production shop. All of the advantages resulting from high speed dry machining may be realized, providing certain basic precautions are observed.



TYPICAL staggered tooth milling cutter for machining magnesium alloys.

As early as 1926 German machine tool manufacturers had developed milling machines operating at cutting speeds as high as 5000 ft. per min., and feeding at a rate of 5 ft. per min. High speed lathes, drills and other tools were also produced. One particular lathe for machining magnesium billets, with a cutting speed of 3940 ft. per min. and a feed of 0.023 in. per rev., permitted a billet 31½ in. long and 5½ in. in diameter to be machined in 29 sec. In general, it may be said that wherever possible high speed tools should be used for machining magnesium alloys, or if such tools are not to be had, those available should at least be operated at maximum speeds.

All tools in action on magnesium alloys must in every case be taking off a definite cut. It is most inadvisable to "take a skim" or merely dust the surface, since this is likely to cause a spark which may ignite the loose swarf. This risk is also present if a cutting edge is dragging, that is, if the rear of the blade or cutter makes contact with the work behind the cutting edge of the cutter.

General Precautions

In English practice all possible measures are taken to *allow converging chips freedom to disperse* by providing adequate chip room and by polishing the drill flutes and top rakes of cutting edges. Extreme care is exercised to insure that the *cutting edges of all tools are kept sharp and keen* at the point of contact with the work. If they are in the least blunt, or even slightly damaged, not only will the machined surface be rough but considerable heat will be generated.

Swarf fires usually result upon development of a temperature of approximately 932 deg. F. Such temperatures might arise from the following causes:

(a) Faulty tool design, that is, excessively small clearance angles.

(b) Contact between the ma-

Magnesium Alloys . . .

chined surface and the rear of the cutter, causing small thread-like chips which can be easily ignited.

(c) Blunt tools, which form swarf by gouging rather than by cutting.

When sufficient attention is paid to these points, swarf fires in dry machining are extremely rare.

Cooling

As previously stated, the low cutting pressure and high thermal conductivity characteristic of magnesium alloys generally maintain temperatures at a point sufficiently low to prevent fires without artificial cooling. In the case of milling cutters, the air has a considerable cooling effect on the cutting edges at the high speeds generally used. Moreover, since the surface condition is not improved by cooling, it is customary British practice to machine magnesium alloys dry.

On certain automatic lathes, however, the part being machined and the tools employed are too small for the heat to be rapidly conducted away at the high cutting speeds. Cooling is required in such cases and it has been found necessary occasionally to resort to a liquid coolant. (When the use of a liquid coolant is indicated, the emulsion type of coolant should be studiously avoided. Only acid free, anhydrous oils with characteristics similar to Shell Oil No. MA21 should be employed.) It is strongly urged, however, that compressed air be first tried, the current of air being so directed as to disperse the swarf in the direction of its container. In the majority of cases where a coolant is indicated, compressed air has been found entirely adequate with the added advantage of a clean, liquid-free swarf with a high melting recovery.

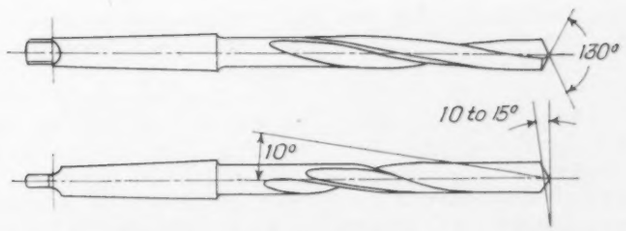
English practice utilizes milling cutters as illustrated. Experience has indicated that the most satisfactory cutting angles are 7-12 deg. top rake and 12-7 deg. front rake. Cutters or blades ground to a feathered edge or with a land of 0.015 in. at the maximum have been found most essential. The speed can be as fast and the feed as coarse as circumstances permit. No lubricant need be used.

. . . British practice is to machine magnesium alloys dry, whereas in this country most operations are performed wet to reduce the fire hazard. If cutting tools are properly designed and maintained, cutting may be safely done dry, says the author, who is on the staff of the firm selling Electron magnesium alloys in England and who is at present in this country as a consultant on the construction of a new magnesium plant.

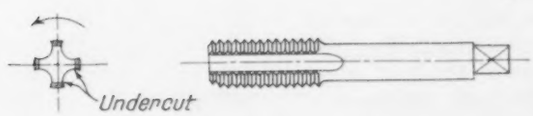
Drilling

The type of twist drill as illustrated has been developed in England and found to be entirely satisfactory. The body diameter has as little land as possible (0.015 in.) and the flutes are as wide and open as the strength of the drill will allow and *always well polished.* Care is taken not to have the flutes too "slow" (helix angle too steep) or the drill will run out of line, especially if not ground correctly.

Owing to the quick cutting action, the swarf forms up the flutes in large quantities, and a blocked drill results if the flutes are narrow, small or unpolished. Cutting edges must be kept clean. They must cut dry and as fast as the drill permits without heating up.



THIS type of twist drill has been found to be entirely satisfactory in British practice in drilling magnesium alloys. The flutes are highly polished. Note the "fast" spiral angle employed.



TAPS should be sharp both on the lead and along the flutes. The lands should be as narrow as possible to provide maximum chip space in the flutes.

If the drill is allowed to get dull, the result is a hole which is too small and a swelling develops on the starting point of operation.

Reaming

Similar principles apply to reaming as in the case of twist drills. The cutting edges have as little land as possible (0.015 in.) and are well backed off and polished. Rake angle is 5 to 10 deg. The use of a coolant has been found advisable on long holes.

Since the metal tends to close in on a reamer while cutting is taking place, it has been found necessary to make reamers a shade larger for magnesium alloys than for other metals; i. e., from 0.0005 to 0.0015 in. oversize, according to the diameter. Cutting slightly oversize also compensates for the contraction that takes place when the metal cools.

Good results are obtained by keeping the length of the sizing part of the reamer as short as possible. It is generally recommended to use right-hand cutting reamers with left-hand spiral and vice versa on open holes where chips can get away.

Tapping

Taps should be sharp both on the lead and along the flutes. A positive rake at the cutting edges is sometimes used with advantage. This allows the tap to cut slightly oversize, and counteracts the tendency of the metal to close in on the tap and leave the tapped hole undersize. A similar result is obtained if the cutting edges of the tap are allowed to get dull.

The most important point, however, is to have the lands as narrow as is consistent with fair life of the tap and to have the maximum chip clearance obtainable.

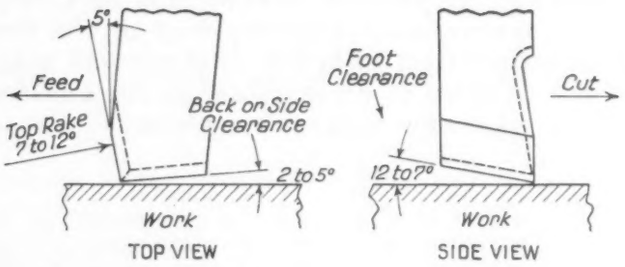
A trouble sometimes experienced in tapping is in the "backing out" of the tap. Whenever possible the tap should be taken right through.

When tapping with ground taps that are form relieved it is obvious that, in reversing, the tap must present a wedge shaped orifice to the swarf in the thread, and that, therefore, the swarf must jam in the thread of the tap. After 10 to 50 pieces have been tapped, this jamming action will increase the minor diameter of the tap and thus causing it to cut oversize on this dimension and to admit the "Not Go" gage. The solution can be found in one or all of the following:

(a) Use of a very narrow land, thus minimizing the form relief.

(b) Eliminating form relieving by cylindrical grinding of the threads.

(c) Use of a slight smear of oil or tallow. Contrary to other machining operations on magnesium alloy, this will give good results and also lengthen the life of the tap. Experience gained from the tapping of 9000 7/8-in. British Standard Pitch holes revealed the necessity for (a), (b) and (c), especially (c).



SHAPER or planer tool for magnesium alloys. The same angles also apply to single point boring, turning and facing tools.

Single Point Cutting Tools

All cutting edges of boring, turning and facing tools should be kept keen and sharp. The rake on the cutting edges are from 7-12 deg., the clearance being better when made acute. The cutting is dry and fast. The same design principles also apply to shaper tool illustrated.

Band saws made of a special self hardening steel are usually recommended in English practice. A 1¼-in. blade with 5 teeth per in. is operated at a peripheral speed of approximately 5300 ft. per min.

Grinding

English practice is to dry grind almost exclusively, whereas wet grinding is quite frequently used in Germany. For dry grinding, special equipment has been developed to quench the dust immediately it leaves the grinding wheel.

In the type of equipment most widely used, the dust is exhausted at the grinding point and immediately passes through a spray of water from several nozzles. This air-dust-water mixture is conveyed through a pipe to the separator outside the building, where the dust and water descend to the sludge pit which they enter below the water level. This pit is divided by baffles to prevent, in so far as possible, the ultra fine dust from floating to the surface of the water and being discharged through the overflow. The fan, driven by a dustproof motor, is installed on the separator, which is a plain pipe of sufficient cross-sectional area to insure that the water, owing to reduced air speed, will fall out of suspension and descend to the pit while only the air will be drawn through the fan.

The controls of the exhaust equipment are so correlated with the grinder that the latter cannot be started until fan and water spray are operating, and will stop if for any reason the exhaust suction should cease. The interiors of all pipes are smooth. The air flow at the point of grinding is not less than 100 ft. per sec. through a 5-in. minimum duct for a grinding wheel not larger than 18 by 2 in. The distance from grinder to sludge pit is held to a minimum. The sludge is periodically removed from the traps, mixed with 5 parts of sand to 1 part of sludge and buried. It is common practice to have clothing of grinder operators chemically treated so dust will not adhere readily.

For polishing operations, sand paper, *not* emery paper, is customarily used. The part is oiled after polishing.

Oil and dirt may be removed either by use of an alkali or by a standard degreasing solution. Acid baths should not be used. Parts washed in hot water will dry quickly.

Armco Introduces Sendzimir Mill

. . . New roll-backing principle permits use of work rolls only 1 to 4 in. in diameter, reducing overall weight and power consumption, particularly on high carbon and alloy steels.

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AN unusual type of cold strip mill, small in size and very efficient, is especially suitable for producing stainless, high carbon and other difficult-to-roll steels. It has the reducing power to roll fine gages from hot-rolled strip without intermediate annealings, and is said to be capable of rolling strip to a tolerance of a few ten thousandths, without crown or camber.

It bears the name of its inventor, Thadeus Sendzimir, and was first introduced in Europe in 1934, where six installations were made prior to the outbreak of the war. America's first Sendzimir mill began operating in the Chicago area last year and is now running full time on war work. Announcement of the availability of this new type mill is made by the Armzen Co., an American Rolling Mill subsidiary.

The fundamental principle of the mill is the use of a cluster backing, which makes it possible to take advantage of efficient, small-diameter rolls. The size of these rolls depends on the nature of the strip, but not upon its width, and they run between 1 and 4 in. in diameter. Sendzimir roll backing is done by the heavy beams of the housing itself, through intermedially spaced supports. The backing elements that transmit the roll-separating force from the work rolls to the beam of the housing consist of shafts with roller bearings alternating with saddles.

The function of the saddles is to transmit roll-separating forces directly to the beams of the housing. In this way the roll-separating forces, distributed uniformly along the small-diameter work roll, are transmitted either directly, or through intermediate rolls over the backing bearings, to the saddles

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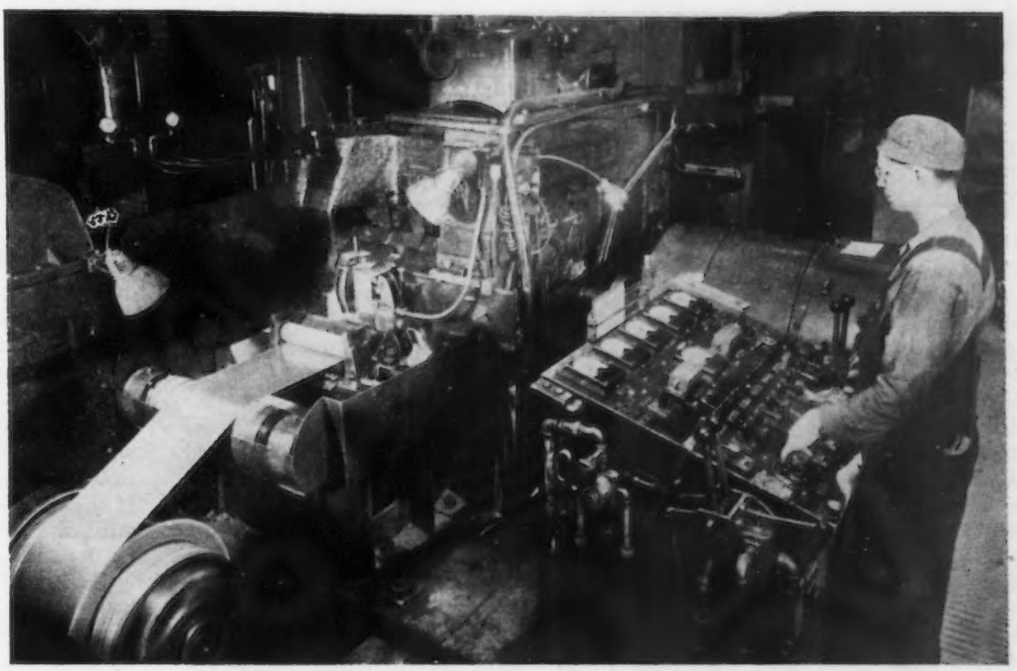

THE Sendzimir mill in operation in this country, with control panel in foreground. The inventor of the mill also invented the Armco Zincgrip process whereby iron and steel sheets are given a tightly adherent coating of zinc.

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which rest in beams of the mill housing.

Backing-up elements in a Sendzimir mill can be varied to suit conditions. For rolling highly resistant materials, particularly when fine gages of 0.005 in. or less are required, the mill may be arranged as shown in Fig. 1. Here the first-intermediate rolls are power driven. The three second-intermediate rolls carry the roll-separating forces to four rows of backing rings. The two inner rows of backing rings are 9 in. in diameter, and the two outer rows are 12 in. With this arrangement, Carboloy and other sintered work rolls can be used, as their diameters are only 1¼ in. and they have no torque to transmit. It is said that strip widths can be equal to or greater than those handled by conventional mills.

A setup like this shows why Sendzimir work rolls can be loaded very high without danger of spalling. The reason is that the highly stressed area is not where the work rolls contact the strip, but where they contact the backing rolls. The roll contact with the strip is spread over an area that can actually be measured in square inches, whereas the bearing of the work roll on the backing roll is more nearly a line contact.

In the roll arrangement shown in Fig. 1, the roll-separating force is taken up by the first intermediate rolls at such an angle that each bears less than 70 per cent of the burden.

The relatively small size of the Sendzimir mill as compared with conventional units is based on the laws of loading of beams. A rectangular beam of the new mill housing deflects less than a round backing roll of the same section. The ends of the beams of the Sendzimir mill form one piece with the vertical columns, and the deflection of a fixed beam is only about one-fifth that of a free beam. These facts, coupled with the small size of its rolls and backing elements, make the new mill relatively small and compact.

An ordinary 50-in. four-high mill has two housings, each weighing 90 tons. Its total weight including pinion stand, rolls, spindles and bed plate would be in the neighborhood of 250 tons. A Sendzimir mill for 50-in. strip weighs less than 75 tons complete, and it is said that its motors can be as much as 30 per cent smaller.

Shafts supporting the back-up bearings are eccentric. By turning them over a certain angle the distance between the work rolls can be increased or decreased at will. This mechanism performs the same function as conventional screwdowns, yet its inherent parallelism prevents the application of greater pressure to one side of the strip than the other. The mill makes no demands upon its raw materials beyond ordinary hot strip mill tolerances.

The Sendzimir mill can be arranged as a single-stand reversing unit or as a tandem mill. The latter is preferably built within a single housing, in which case the mutual compensation of forces allows a further weight reduction of about 40 per cent. For narrow strip widths, up to 40 in., directly driven work rolls are used. For wider strip it is preferable to drive the intermediate rolls.

An important factor to be considered in the rolling of fine gage strip is the flattening of work rolls at the point where they contact the material. When heavy work-hardened material is rolled down to 0.010 in. and finer with 16-in. diameter rolls, the point is soon reached where additional screwdown pressure results only in increased roll flattening without further reduction of the strip. It is at and beyond this critical point that the Sendzimir mill may have an advantage. It will produce reductions of 30 per cent or more per pass on 0.010 to 0.004-in. stock, even on work-hardened alloy steels.

This point is graphically illustrated in Fig. 2, where the two enlarged sectional views show the roll bite of 16-in. rolls (top) compared to 1½-in. rolls (bottom). Both are shown reducing a 0.050-in. strip to 0.030 in., a 40 per cent reduction. If the delivery speed is 1000 ft. per min., the feeding speed will be 600 ft. per min.

The smaller contact area, and hence the lower roll-separating force on the small diameter rolls is easily seen. Another factor is the

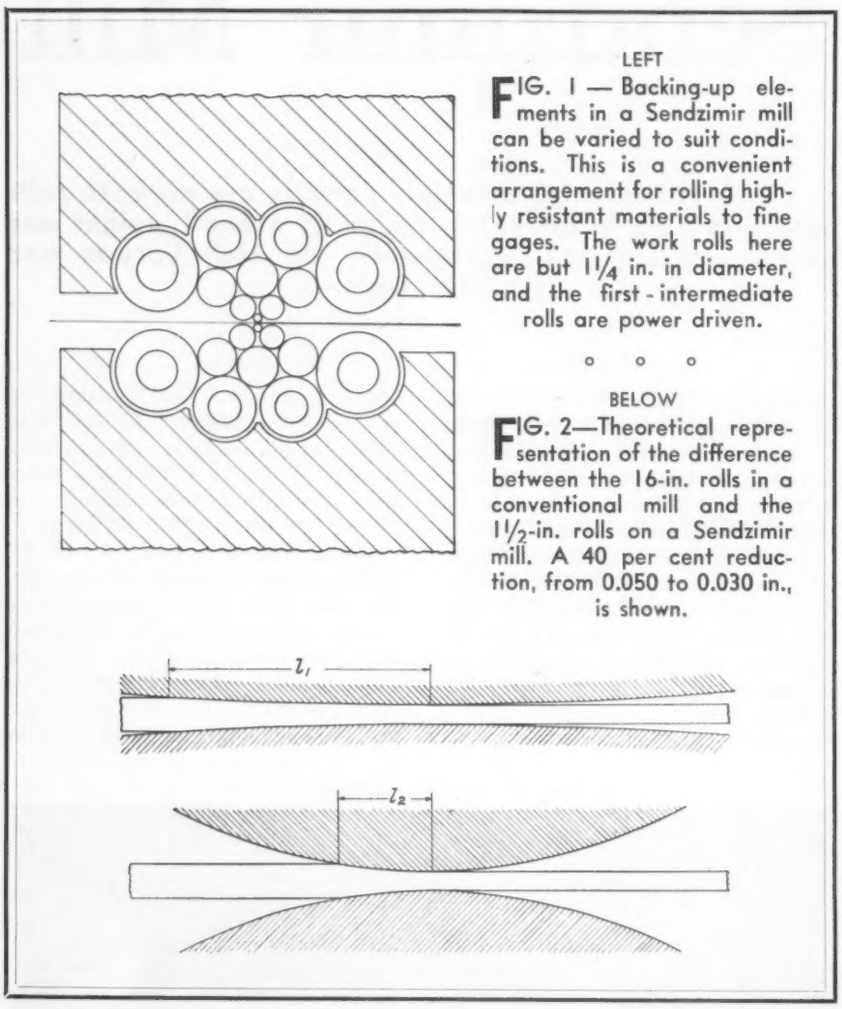

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FIG. 1 — Backing-up elements in a Sendzimir mill can be varied to suit conditions. This is a convenient arrangement for rolling highly resistant materials to fine gages. The work rolls here are but 1¼ in. in diameter, and the first-intermediate rolls are power driven.

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BELOW

FIG. 2—Theoretical representation of the difference between the 16-in. rolls in a conventional mill and the 1½-in. rolls on a Sendzimir mill. A 40 per cent reduction, from 0.050 to 0.030 in., is shown.

tremendous pressure prevailing over the larger contact area. This pressure causes friction which gradually swallows up the effect of back tension as the strip progresses deeper into the throat. Near the exit end there is actually a "crowding" of pressure like that set up in an extrusion die.

Proof that friction "crowds" the pressure as the strip moves within the roll bite is offered by a check on delivery speeds of the two sizes of rolls in comparison with their surface velocity. With small rolls the two are almost equal, provided that the forward tension and drag are well in balance. In larger work rolls under similar tension conditions the delivery speed of the strip may be 6 per cent or more in excess of the surface velocity of the rolls. As a result of this design difference, power consumption on the new mill is cut by 30 per cent, according to the manufacturer. More substantial savings are said to be attainable on hard alloy steels.

Fig. 2 is theoretical, in that it shows non-deformed rolls. Actually they flatten somewhat at the area of contact. In this case the flattening, assuming the rolling of low carbon steel, would not amount to much. It would cause a 13 per cent increase in the length of contact for the 16-in. rolls, and a 3½ per cent increase for the 1½-in. rolls. But on fine gages, such as taking a pass from 0.010 to 0.006 in. on low carbon work-hardened material, the 16-in. rolls would increase their length of contact by 60 per cent; and on stainless the increase would amount to 154 per cent. On 1½-in. rolls the corresponding increases would be 16 and 38 per cent respectively.

On conventional mills, the deflection of work and backing rolls is greatest at the center. To eliminate this the rolls are crowned for a certain roll-separating force. This results in a flat strip for a corresponding pass reduction. However, should the roll-separating force be less, as when a light pass is taken, the center of the strip would be over-rolled, and the reverse would be true if too heavy a pass were taken.

In the Sendzimir mill this same type deflection is present, though its magnitude is not as great. To overcome its effect on the strip, means are provided to give the saddles and other backing elements close to the edge of the strip a proportionally larger deflection than those near its center. Thus when the two deflections are superposed their sum is uniform over the width of the strip. The result is a strip with neither crown or camber.

Lubrication of the Sendzimir mill is unique in that its housing provides space for a filtered lubricating bath for the rolls and all backing elements, and the strip travels in this bath for some distance. This permits certain materials to be rolled at predetermined temperatures, at, say, 300 deg. F. or higher. Where it is necessary to keep the strip dry, the lubricant is simply circulated through the bearings and back to the tank without entering the roll space between the housings.

Galvanized Scrap Burned

GALVANIZED steel is unacceptable to steel producers because of the difficulties encountered in removing the zinc carried into the melt and obtaining tap metal of the desired analysis.

Due to the serious scrap situation, and the need to use every available source of steel, the Texas Materials Corp., Houston, has devised a method whereby a considerable proportion of the zinc is burned off the steel, and the scrap thus made available for cutting to furnace length and charging with other scrap.

In a cleared section of the yard a layer of shattered storage battery cases—waste or worn-out batteries are scrapped for the lead in the plates—is spread inside an enclosure made of old ice cans. The enclosure is simply an aid to more uniform stacking and cuts down on the amount of battery box material required.

Over the layer of box material is spread a layer of galvanized scrap, then more box material, until a pile of the desired proportions has been built. Oil is then thrown onto the windward corner of the pile and ignited. The intense heat generated by the burning of the battery boxes burns off a great deal of the zinc on the steel, and it becomes acceptable scrap material. The heat generated by 500 lb. of battery box scrap will clean up a pile of some ten tons of steel scrap, if properly piled.

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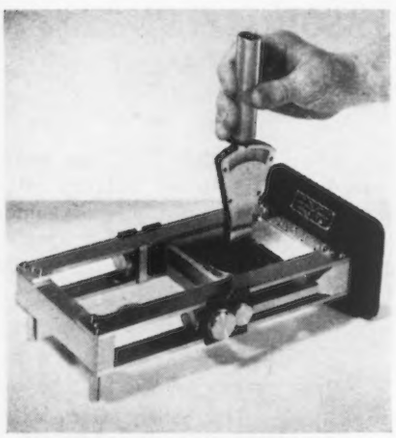
TEN tons of galvanized steel scrap and 500 lb. of shattered storage battery boxes piled within a temporary enclosure of ice cans preparatory to igniting the pile and burning off the zinc coating to render the steel usable in open-hearth or electric furnaces.

New Equipment . .

Gages and Small Tools

Close tolerances on armament work require quick and accurate gaging. Here are several new gages and other accessories useful in the tool room and on the production floor.

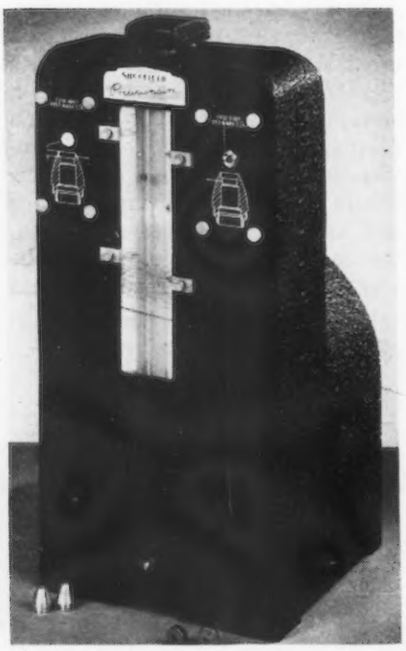
THE Ellstrom internal setting gage was designed to eliminate the time-consuming method of setting instruments and gages by using clamps and parallels with gage blocks. A product of the *Dearborn Gage Co.*, its gaging surfaces are finished to millionths in flatness. If the gage is adjusted for a 2-in. reading and a 1.875-in. reading is desired, it is not necessary to make an adjustment; all that is required is to wring a 0.125-in. gage block on the bottom sur-



face of the gage. This gives a 1.875-in. check. It can be used either vertically or horizontally, and is quickly adjusted by two thumb screws on each riser. Overall height is 12 in.

Multiple Checking Gage

THE *Sheffield Corp.*, Dayton, Ohio, has announced the development of a gage that simultaneously checks internal or external diameters and depths. Known as the Precisionaire-Electricheck, it contains two sections which, though independent of each other, work simultaneously. One section measures the rate of flow of air passing



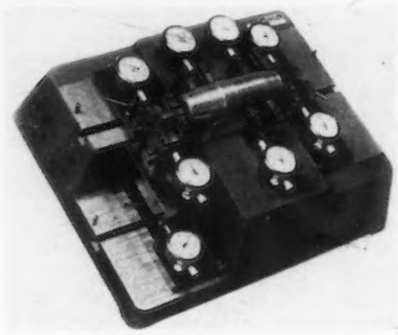
between the gaging spindle and the internal diameter; the other has an independent reed mechanism gaging unit. Floats in tubes, plus colored lights on the panel show the dimensional accuracy of the piece being checked, and give a quick indication of acceptance or rejection.

Profilometer Accessories

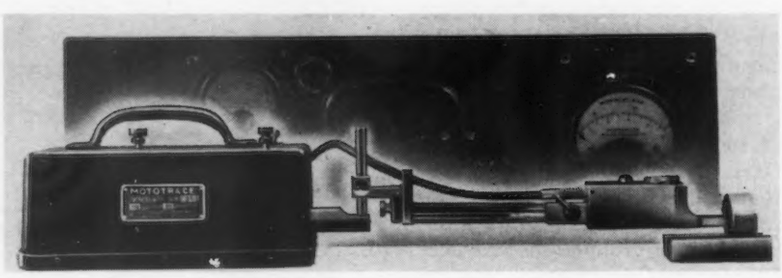
TWO new accessories for Profilometers are offered by the *Physicists Research Co.*, Ann Arbor, Mich. One, the Motorace, is now electrically operated, and is said to be especially valuable for securing accurate readings on very fine surfaces. It is also useful for measuring awkward shapes, distances as short as 1/32 in., gear and hob teeth and surfaces adjacent to shoulders or bosses. A second instrument just introduced is a power pack designed to adapt Profilometers for use on a.c. lines. Existing Profilometers having serial numbers of 75 or greater can be converted by returning them to the company for the purpose.

Shell Gaging Unit

AN instrument which simultaneously checks inside and outside diameters of shells is a new



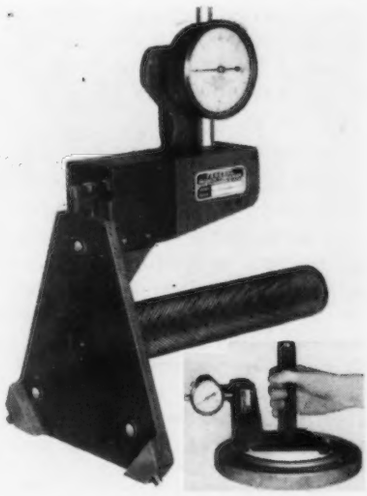
development of *Federal Products Corp.*, 1144 Eddy Street, Providence. The tracer threads are checked for concentricity with the counterbore, and the counterbore is



checked in turn for concentricity with the outside body of the shell. In all, a total of eight points are checked for concentricity with dial gages. Federal Products Corp. points out that several diameters cannot be checked for concentricity and diameter on the same gage; the difference is that concentricity implies that all diameters have the same center, while several diameters can be correct as to diameters but not be concentric. The two are different inspection jobs.

Dial Indicator Gages

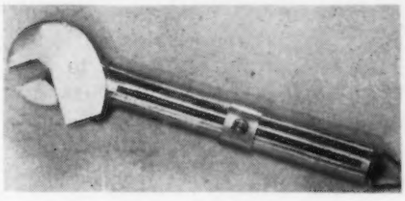
A NEW dial indicator gage for production measurement of the inside diameter of shallow holes and recesses has recently



been developed by *Federal Products Corp.*, Providence. Graduated in ten-thousandths, it has a dial range of 0.025 in. Motion of its sensitive contact is carried back to the indicator through a spring hinge to eliminate the lost motion which would be present if bearings were used. The company, which builds special gages to order, also announces a gage for checking concentricity of rings, and one for measuring the distance between the faces of crankshaft bearings.

Adjustable Wrench

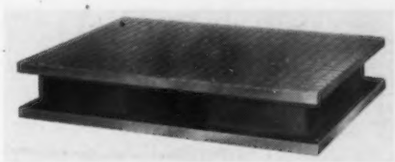
AN ingenious wrench, said to have a quickly adjustable vise-like self locking jaw grip, is



now in production at the *Pack-Rite Machine Corp.*, Milwaukee. Adjustment is made by sliding the handle band up or down on the handle. One hand operation is possible, and the jaws will not bind when released, according to the manufacturer, who will supply it in four sizes, in nut and pipe wrench types.

Duplex Bench Blocks

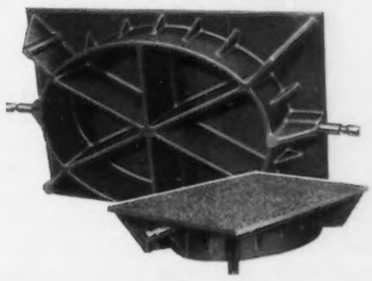
DOUBLE utility is provided by the new duplex bench blocks made by the *Challenge Machinery*



Co., Grand Haven, Mich. These blocks have working surfaces both top and bottom, and are available in three combinations. Surfaces can be either smooth, or grooved in ½-in. widths or combinations of these finishes. Both surfaces are precision ground, though hand scraped finishes are obtainable if desired. The plates are 10 in. wide, 14 in. long, and 2⅜ in. high. They are made of semi-steel, stress relieved.

Surface Plate

SMITH TOOL WORKS, Bucyrus, Ohio, are now manufacturing cast steel surface plates that are said to maintain their accuracy over a long period of time. A large elliptical rib, reinforced with a six-point spider rib, and supporting ribs running to the outer edges, gives unusual stiffness and



rigidity, the manufacturer states, adding that fine grain steel and controlled hardness are designed to eliminate future distortion.

Dry Storage Unit

TOOLS, dies and gages can now be protected against the effects of excess moisture by a new cabinet type de-humidifer built by *General Air Conditioning Corp.*, 4420 Appleton Street, Cincinnati. The excess moisture is absorbed from air in the cabinet by dehydrating chemical cubes, and circulation of dry air throughout the cabinet is provided by a flue that runs up both sides to the top of the

chemical unit. The cabinet is made of wood, 34 in. high, 38 in. wide and 14 in. deep. Separate "Water-Sorber" units are available for rooms and spaces where infiltration is at a minimum.

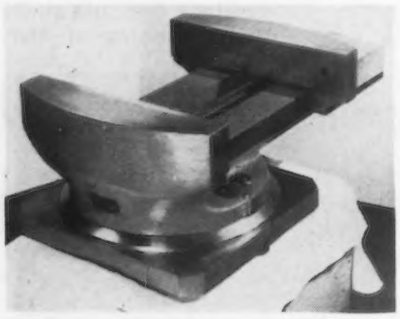
Tool Cabinet

CONVENIENT storage of DOALL machine supplies and accessories is provided by a new cabinet produced by *Continental Machines, Inc.*, Minneapolis. It eliminates the practice of hanging saw and file bands from nails, a practice injurious to the bands and

dangerous to personnel. In addition, wrenches and other tools are handy and not liable to be misplaced.

Heavy Duty Vise

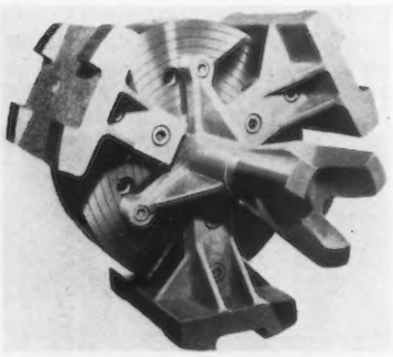
COMPLETE graduations around the dial of its swivel base, and positive locking screws are the main features of the improved Rouselle VICTORY vise, manufac-



tured by *David J. Ross Co.*, Benton Harbor, Mich. Other features of the tool are a clean-out hole in the base and an easily removable screw nut. Three sizes are available, with 7, 10 and 13-in. jaw openings.

Air Chuck

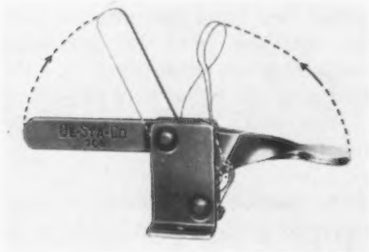
FORGED steel flasks, 21 in. in diameter with ⅜-in. thick walls are being machined to 0.010-in. tolerance on the outside diameter by means of AIRGRIP chucks made by *Anker-Holth Mfg. Co.*, Chicago. Each chuck weighs 464 lb.,



and has a 24-in. locator mounted on a 15-in., 3-jaw universal chuck. The jaws have a stroke of 1 in., and expand 1 in. in the flask. 12 pads prevent distortion of the flask wall. A special feature of these chucks is their matched false jaws, balanced to within ¼ oz.

Toggle Clamps

THE *Detroit Stamping Co.*, has added to its line a light duty toggle clamp with a pressure ratio of 50 to 1. To reduce the height required, the handle and clamping bar assume a horizontal position when the toggle is clamped. Weight of the clamp, the model 215, is 8½ oz. A lighter clamp of the same



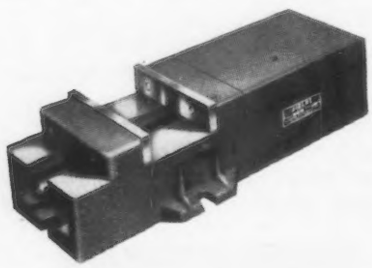
type is designated as the No. 205. Designed to meet aircraft demands, it weighs but 3⅛ oz.

Coolant Strainer

THE *Metal Textile Corp.*, Orange, N. J., is now building a strainer to filter out metal chips and cuttings from machine tool coolant systems and save wear and tear on the pump. Shop practice reveals that the "Metex" strainer will operate without interruption for 4 to 6 weeks. Refills can be installed in a few minutes. The dimensions of the strainer are: height, 2¾ in.; diameter, 5 in.; and over all height, 4¼ in.

Pneumatic Vise

A NEW addition to the "Airlox" line of *Production Devices, Inc.*, East Hartford, Conn., is designated as the Airlox Senior



Pneumatic Vise. It utilizes an air piston and lever assembly to give clamping pressure higher than that obtainable on a screw vise of the same size, while retaining the speed and adaptability of air. The operating mechanism is enclosed to shield it from chips, dirt and coolant. The jaw width is 7½ in., depth is 1½ in., and the maximum jaw opening is 7 in. Gripping force on the work is 50 times the air pressure; jaw stroke is ½ in.

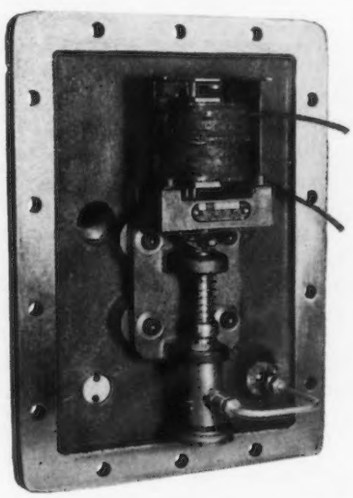
Electric Counter

ANY number from 1 to 9999 can be quickly set up to operate an electric circuit at a predetermined point on a new counter built by the *Production Instrument Co.*, 708-16 West Jackson Boulevard, Chicago. Count ceases upon reach-

ing the set figure, and can be reset immediately for a new series. The counter is intended primarily for use on conveyors, and is actuated by any switch, relay or photo-electric unit with a closed period of 0.035 sec. or more, and an open period of 0.040 sec. or more.

Machine Tool Lubricator

MACHINE tool builders are indicating a growing interest in *Bijur* solenoid operated lubricating pumps, according to an announcement by their manufacturer. One use is in connection with centralized automatic lubricating systems. Where semi-isolated units of a special machine are to be lubricated, they can be incorporated in each unit. The Bijur lubricating



system generally consists of the pump and reservoir unit, together with branched oil feed-line, and meter unit at the bearing surfaces. The system is adaptable to any machine layout. Meter units can be located at any distance, height, or level in relation to the lubricator position.

The spark plugs Eddie doesn't sell will help smash the Axis

"You know how it is when a spark plug in your car stops firing? Seems to drain all the power from your engine. It's the same way in an airplane or tank. And for each plug in your engine a bomber has a dozen. By taking good care of my customers' plugs I not only save them gasoline and money, but I also save a lot of plugs for use on Schicklgruber."

When Uncle Sam stopped the manufacture of cars for general use, he did more than change the greatest automobile plants in the world into arsenals for tanks and planes. He also released the giant facilities of the spark plug manufacturers for the making of war materials. But in giving these firms new things to make and new alloys to make them of, he handed them new problems with every sheaf of blueprints.

In cooperation with the Revere Technical Advisory staff, leading spark plug manufacturers made the conversion smoothly with a minimum of headaches. For Revere not only supplies industry with sound copper alloys, produced with the help of the most exquisitely accurate instruments known to metallurgy, but also provides skilled assistance in the methods of processing and fabricating.

Copper is one of the most vital of all war materials. Every ounce goes directly into the essentials of modern warfare. Fortunately, Revere is well equipped, with modern plants, improved machines and advanced techniques, to supply a substantial part of our nation's mounting needs. And Revere research is continually exploring new frontiers in copper alloys to provide us all with stouter, keener, swifter tools for victory.

The Revere Technical Advisory Service functions in (1) developing new and better Revere materials to meet active or anticipated demands; (2) supplying specific and detailed knowledge of the properties of engineering and construction materials; (3) continuously observing developments of science and engineering for their utilization in production methods and equipment; (4) helping industrial executives make use of data thus developed. This service is available to you, free.

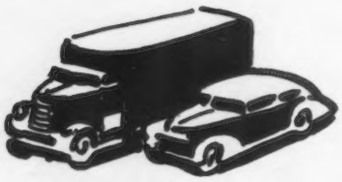
REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

EXECUTIVE OFFICES: 230 PARK AVENUE, NEW YORK

Assembly Line . . .

• Wildcat stoppages interfere with war output, showing difficulty in organizing orderly flow of goods . . . Available tools and gages being reported weekly.



DETROIT—Hot weather and hot tempers combined here last week to demonstrate the difficulty of organizing an orderly flow of war goods so long as one-third of America's war triumvirate —men, machines and materials— goes uncontrolled.

Last week saw a surge of many small, wildcat work stoppages which cut off the transportation of war workers, slowed down production at the Ford Willow Run plant, made the Ford chemical plant at Iron Mountain idle, and at the time this is written, kept Fisher Body tank plant at Flint idle.

While most of these labor disturbances were not "approved" stoppages and were of short duration, they nevertheless had as detrimental an effect upon the flow of war goods as hold up in the shipment of steel or machinery.

There is, however, this distinction, that machines and materials are under such Federal controls that make it possible to immediately counteract such a delay by a shifting of shipments from less important jobs. This is not possible today with work stoppages due to labor disturbances.

Typical of this unknown production element which uncontrolled labor injects into the war effort was the short-lived strike last week of a handful of employees of the Detroit's municipally-owned surface transport facilities. While this strike was officially disavowed by both the CIO and AFL, it, nevertheless, succeeded in keeping a number of workers from their jobs in local war plants. At one G-M plant it was reported that 20 per cent of the employees were unable to report for work on the morning of the strike.

ON the same day a wildcat sitdown of 1½ hr. duration occurred at the Ford Willow Run bomber plant over the removal by company officials of an unauthorized employees' telephone installation. The Ford chemical plant at Iron Mountain was also made idle, pending the settlement of a series of union (CIO) demands. The strike at the Fisher tank plant in Flint, while reported nearing settlement, was still in progress late in the week. This work stoppage was said to be a protest against the suspension of 30 welders for smoking in prohibited areas.

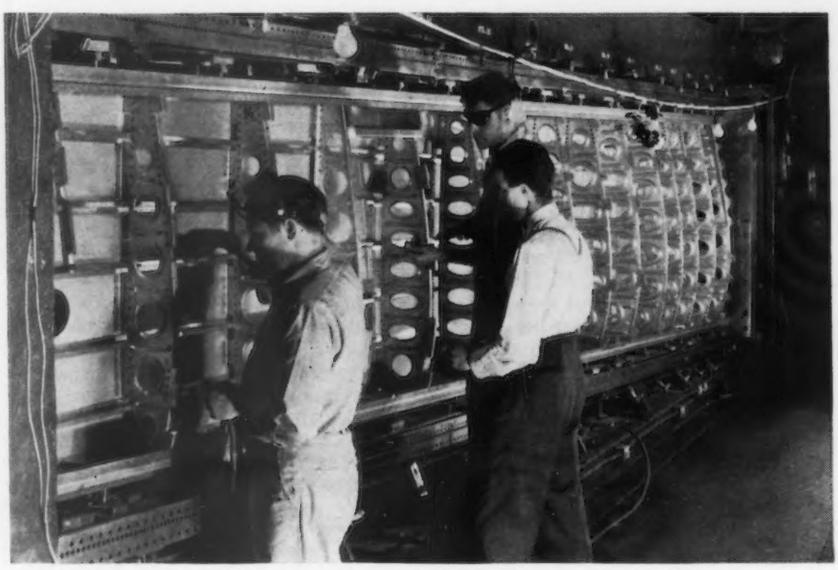
Another phase of the labor problem, that of worker fatigue, was highlighted last week by the report that most of the small tool and die shops in Detroit were changing from a seven-day week to a six-day week. This move, the Automotive Tool and Die Manufacturers' Association said, was due to the large scale absenteeism which was experienced with the seven-day schedule. Most of these plants work on two 10-hr. shifts a day, the scarcity of skilled workers making it impossible to set up three-shift schedules.

Uncontrollable absenteeism in plants on the seven-day schedules had reached the point, it was asserted, where it was felt that a six-day schedule would provide more efficient production. The loss due to the reduction of the working week is expected to be a good deal less than a day's output, for the rate of absenteeism on the seven-day schedule did not result in a full seven days' production per man.

The experience of these plants with the seven-day week coincides with experience in English war plants and agrees with the views often expressed by industrial personnel managers that too long working hours are just as bad as too short. It is quite likely that the hot weather will force similar action in other industries where work is carried on on a seven-day per man basis.

Contrasting with the paradoxes

PRODUCTION IN WILLOW RUN BOMBER PLANT: The assembling of outer wing panels is expedited by the use of huge special fixtures, well shown in this photo. At extreme upper right note wheel and track. The large fixture is moved by hand. When completed the vertical wing section will be lifted from the fixture by a crane and a new wing section will be started in its place.



CHIPS... in the biggest poker game the world has ever known

THESE are the chips that will win the game of war . . . the chips that curl off the cutting tools of American machines. Pictured below is a hundred-thousandth-of-a-second interval in a normal 24-hour day during the life of a P&W Curvex Cutter . . . milling a recess in an aircraft engine housing. It's sharp, clean cutting, moving fast even though our "frozen-action" camera "stopped" it cold. Those thick, husky teeth are almost new — but they can be reground again and again, down to thin wafers, before their useful life ends. Many hundreds of engines will have felt their precision bite.

That's *service* from cutting tools. It's building American *strength* in the air.

Don't worry about your Pratt & Whitney cutting tools . . . bear down . . . they can take it.

P&W Photo—Unretouched

PRATT & WHITNEY

Division Niles-Bement-Pond Company

WEST HARTFORD • CONNECTICUT

of the labor situation, is the elaborate setup in operation here to provide full utilization of available machinery for war work.

BOTH WPB and the Automotive Council for War Production have established extensive filing and reporting systems which list machinery now idle but available for war work elsewhere by sale or lease, and also equipment not for sale but available for additional work. The Tooling Information Service of the automotive council is also performing the Herculean task of keeping track of tool, gage and die plants and issues a weekly tabulation of plants which have facilities available for making gages, cutting tools, jigs and fixtures, sheet metal and forging dies.

To round out this picture, the machinery and equipment section of WPB is starting a survey of the utilization of the region's machinery to establish the number of hours which are available on each machine for additional work. This survey is similar to the work being done in other areas and discussed elsewhere in this issue.

The Tooling Information Service of the ACWP each week mails to legitimate war work contractors and the various supply services, a detailed listing of facilities which are open for taking on additional tool, die, and jig making work. This list shows the names of companies which report having such capacity available and gives considerable detail on the type of work that can be handled.

This service is not limited to Detroit, but covers any plant having such vital capacity available. The council responds to any request for aid in locating capacity for war work. To make its service effective, the council maintains a constant check of its listing in order to have available at all times the latest information.

As an example of the valuable service provided by this activity, take the case of a plant making civilian goods which was recently forced to shut down for lack of materials. This plant had a small but efficient die room. These facilities were listed in the council's weekly report and in 10 days' time, this company had received one fairly large contract and several smaller ones for die work for war plants.

In this instance the council served the two-fold purpose of aiding in the conversion of a plant to war work and in locating capacity to take care of important war work.

Another instance of the council's work involved a Louisville, Ky., firm that sought forging capacity necessary to make a part of a war contract the firm had taken. After searching unsuccessfully for such capacity for two weeks, the Louisville company discovered the work the automotive council was doing and asked its aid. Inside of an hour, the company was supplied with six sure sources capable of taking on the work involved.

Both the ACWP and the Machinery and Equipment section of WPB maintain files of machines, now idle, which are available for use elsewhere through sale or lease. Early in the war program, the council realized the need of such a file and called upon its members to supply such information. These files were later turned over to WPB and formed the basis of that agency's activities. Both groups still maintain active files.

The present WPB file covers 1500 machines located in 350 plants. The building up of this file has been entirely voluntary, the company itself indicating whether the machine is available for sale or lease. The machinery is listed in this file with complete details concerning type, age, performance, etc.

When a request for a certain type of machine is received by WPB, it is checked against the file and the company making the inquiry is told where such idle equipment is available. From that point on, the matter is entirely one between the company owning the machine and the company needing the equipment. WPB steps out of the picture once the two parties are in touch with one another.

A suggestion of the scope of this service can be obtained from the fact that from February to June 30, 1010 machines changed hands through the effort of this WPB division.

The requests received by WPB for machinery are many and varied. It has fulfilled a request for a machine of which only five units have been built in 25 years; it has located a 1000-lb. press needed by a plant making machine gun forgings.

STEEL SHELL CASES: Artillery shell cases of steel being produced under new Buick process are here shown undergoing inspection in Buick plant where mass production is under way. The new development worked out in cooperation with the Ordnance Industry Committee will result in saving of millions of pounds of copper and other critical material.

...time is lost and vital materials are wasted!

Let Carpenter help you reduce your Stainless rejects to an absolute minimum. Make use of our diversified experience with Stainless Steel fabricating problems.

If your rejects from blanking, forming or drawing operations are high, enlist the aid of your Carpenter representative. He can help you check tools, dies and lubricants. He can shoot trouble anywhere along the line. And if you need printed material to help your men "get it right the first time", he can provide that, too.

For quick answers to many of your Stainless fabricating problems, we offer the Carpenter Stainless Slide Chart. Here you will find answers to questions such as: *How will it weld? How will it machine? How will it solder? Is it magnetic? Can it be heat treated?*

If you do not already have the Carpenter Stainless Slide Chart, let us know, or get in touch with your Carpenter representative. He will be glad to give it to you, along with any on-the-spot assistance you may need.

THE CARPENTER STEEL CO. • READING, PA.

Carpenter STAINLESS STEELS

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

Washington . . .

• USW wins 44c. a day, union maintenance, checkoff, and daily wage guarantee . . . Roosevelt says wage problem is relative, and reaffirms his faith in continuance of his anti-inflation program.

FAMILY SCRIMGEOUR TELLS OF PROFIT: Bailey (left), William (center) and Maxwell Scrimgeour, father and his two sons, rise to leave a meeting of the House Naval Affairs Committee, July 16, after testimony acknowledging their family of four got $613,798 profits last year getting war contracts for manufacturers on a commission basis. William's wife, mother of the boys, was reported to be the other member of the firm.

WASHINGTON—Acceptance by CIO's United Steel Workers' policy making committee of the War Labor Board "Little Steel" decision was commonly looked upon here as a mere formality. That the union had any idea whatever of challenging the sweeping victory it scored was never taken seriously. Its suggestion of a referendum on the question of rejecting the finding because it granted a 44c. daily wage increase instead of the "demanded" $1 boost was taken to be only a feint. It is the view that the union's gesture of dissatisfaction was made to conceal its gratification over the unprecedented triumph it had registered in getting all of its other demands.

Actually, the technical form of the policy committee's acceptance is believed to have been carefully worked out between President Roosevelt and Philip Murray, CIO and USW head, last Thursday when Mr. Murray was a White House luncheon guest. Although it was several hours later that the decision was handed down, its contents were well known days earlier. Consequently, the telegram sent last Friday to Mr. Murray at Pittsburgh urging acceptance came as no surprise. The President's telegram said that he considered the control of the threatening rise in the cost of living of paramount domestic importance.

"Our government needs every possible authority to control the mounting cost of living," the President declared.

When the decision was handed down, public WLB member Wayne L. Morse told THE IRON AGE "unless Philip Murray accepts the decision, he is through." Mr. Morse said that he thought the decision was a victory for the union, but added that "it is going to be hard to convince Mr. Murray of the fact." Mr. Morse, on "loan" to the government, is dean of the University of Oregon Law School.

In addition to giving USW the wage increase which amounts to $20,900,000 annually, the WLB decision ordered union maintenance, the checkoff and the minimum daily wage guarantee.

President Roosevelt on July 7 expressed opposition to a general wage increase in the steel industry because it would increase the cost of living. While the increase granted obviously is "general," it is the opinion in some quarters that it would have been much greater had it not been for the attitude taken by the President.

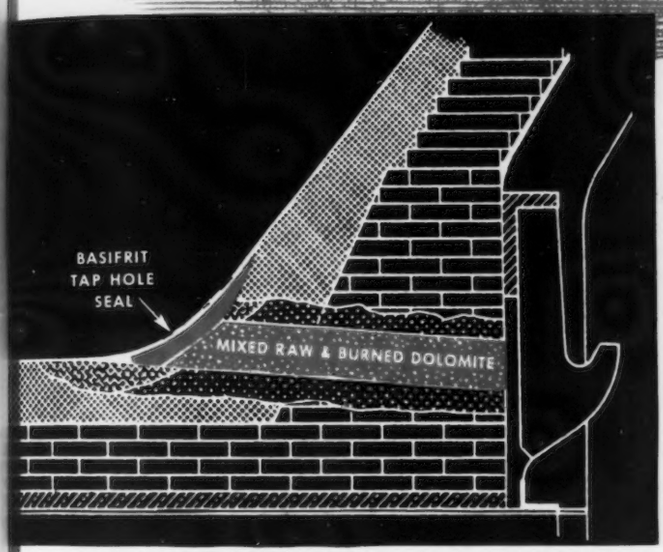
IN arriving at the 5½c. hourly increase, Dr. George W. Taylor, vice-chairman of the board, said that all workers were entitled to maintain their peacetime purchasing power standards of January, 1941. Chairman Davis said that the policy laid down in the decision would lead to a "terminal" for the tragic race between wages and prices.

The basis for part of the increase lay in the finding by the board that in the period between January, 1941, and May, 1942, the cost of living had risen 15 per cent and steel wages had risen only 11.8 per cent in this period. "This," Dr. Taylor said, "is the basis for part of the award, in the amount of 3.2c. per hour to equalize wages up to the 15 per cent increase in the cost of living."

The 2.3c hourly increase was arrived at, according to Dr. Taylor, because the steel workers had an added equity, and an open wage agreement. He said that the steel workers were caught by "a change in the rules in the middle of the game," and that the cost of living had risen disproportionately in steel towns as compared to the remainder of the country.

Dr. Taylor said that there was no mathematical exactness in the fraction of a cent which is speci-

"What can you do for hard taps?" he asked the Basic Engineer



Application of Basifrit patch as tap hole seal. Dolomite mix is dug out of tap hole in usual way. Then Basifrit seal is broken easily with rod.

Basifrit is soaked thoroughly with water and then shoveled in quickly, just before the charge, to form a thin facing over the tap hole opening.

● "We're having plenty of trouble with hard taps. As a result, we're losing time and some of our alloy additions," complained a furnace superintendent to a Basic Refractories Field Engineer. What could he suggest?

This particular Basic Engineer is a veteran steel man. For more than 40 years he has lived with open hearths and electric furnaces. He immediately suggested a way to eliminate the hard taps.

Here is the method: First, the tap hole is filled as usual with mixed raw and burned dolomite. Then *just before the charge*, it is faced thinly with Basifrit, thoroughly soaked with water. This thin facing sets rapidly and safely seals the tap hole opening. The Basifrit seal is not gummy and does not take iron, It gives the second helper a feeling of safety when digging out. Yet it is not so heavy as to be difficult to break through with a rod.

This simple suggestion by a Basic engineer has ended many cases of trouble with hard taps, has cut down delay time and reduced alloy losses. It is typical of practical recommendations offered by Basic service men in their everyday work.

Think of Basic Field Engineers as *your* refractories service men. Their job is to help you get the best out of good refractories — to make those refractories contribute to greater production for war.

BASIC REFRACTORIES FOR THE STEEL INDUSTRY

MAGNEFER — Dead-burned dolomite for hearth and slag line maintenance.

SYNDOLAG — Dead-burned, rice size dolomite for maintenance.

BASIFRIT — Quick-setting magnesia refractory for new construction, resurfacing and maintenance.

OHIO MAGNESITE — Domestic dead-burned high-magnesia grain refractory, equal to Austrian.

695 PLASTIC — Strong plastic basic refractory for hot and cold repairs.

RAMIX — An air-setting, time-saving basic refractory for rammed hearths and cold repairs in open hearth and electric furnaces.

GUNMIX — A basic refractory for maintenance of furnace walls, sized for use with a cement gun.

HEARTH PATCH — For deep hole patching and other quick repairs in the basic open hearth.

RAW DOLOMITE — Washed open hearth dolomite in rice size and standard ¼-inch.

BASIC REFRACTORIES INCORPORATED

FORMERLY BASIC DOLOMITE, INC.

CLEVELAND, OHIO

fied, and that it was adopted to insure a total rate practical for payroll purposes. Dr. Taylor was asked what the considerations of the board were in rejecting the Bureau of Labor Statistics figures showing that between August, 1939, and March, 1942, the cost of living rose only 13.6 per cent while average hourly earnings in steel rose 17.4 per cent.

THE steel workers will receive under the decision retroactive increases from the date of certification, Feb. 6 and 10 which according to the board is part of the "sacrifice" the steel worker will have to accept.

Chairman Davis said that he was convinced that the yardstick of January, 1941, until May, 1942, was thoroughly in accord with the President's anti-inflation program and fair and equitable, but that WLB should not be called upon to decide what groups should suffer lowering of living standards. Congress, he pointed out, should determine the common sacrifice through taxation.

The union maintenance question and the checkoff were discussed briefly by board members, with the insistence that it was voluntary since union members were given 15 days to get out of the union or acquiesce in the checkoff and maintenance. The checkoff was justified, it was said by Frank P. Graham, public member of the board, because the companies did not permit the collection of dues on the plant premises, distances of travel were great, etc. and therefore collection was made difficult.

IN reiterating his opposition to the idea advanced by Roger Latham, industry member of the board, that unions should submit their books and records to the board to be used in consideration of similar cases, Dean Morse said it would be just as logical to require employers to submit theirs. However, Dean Morse expressed the belief that unions should be brought under federal control and regulation in the public interest. He said that anti-labor practices of employers should also be amenable to federal supervision.

CIO chief Philip Murray, Dean Morse, and Lee Pressman, CIO, are all agreed, though they were asked separately, that the steel companies will not go to the courts. Dean Morse thought they might seek relief from the decision after the war.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

DO YOU FIND WOMEN ARE EQUAL TO MEN IN THIS WORK? ARE THEY BETTER OR WORSE?
I SEE NOW THAT IT AIN'T THE HIGH-PRESSURE WORK THAT'S KILLIN' THE OL' BULL O' TH' WOODS-- IT'S GIVIN' OPINIONS LIKE THAT!
THAT'S AN INSULT TO MEN! A MAN SPENDS 30 YEARS AT TH' TRADE AN' STILL HAS A LOT TO LEARN--30 DAYS AFTER TH' WOMEN START, THEY'RE ASKIN' IF TH' LADIES AIN'T GOT US BEAT!
J.R.WILLIAMS
T. M. REG. U. S. PAT. OFF. COPR. 1942 BY NEA SERVICE, INC.
READING · MATTER
7-24

Railroads Start on Intensified Campaign

Washington

• • • **An intensified campaign** has been inaugurated by the railroads to conserve and reclaim every bit of material possible. Special attention is being given to scrap metal and rubber. The railroad salvage campaign, being directed by the Association of American Railroads, refers to scrap as "precious metal." The new instructions to member roads also emphasize the need of substitutes for rubber and the marketing of new rubber.

The campaign is being conducted by the Association's purchase and stores division in cooperation with the mechanical and engineering divisions. The three divisions have issued a list of more than 700 definite recommendations for recovery and repair of materials, covering almost every article used by the railroads.

"Scrap boxes and docks," the institution points out, "should be carefully watched and no steel sheets, bars, shapes, or material of any kind scrapped that can be reclaimed and made suitable for further use. Under present conditions steel castings, bolsters, and couplers, should be welded wherever permissible so that the materials can be kept in service."

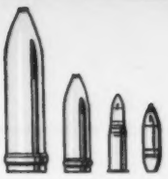
Rails, frogs, and switches should be welded, and angle bars reformed so that railroad maintenance can be kept up with the minimum demands for new materials, the carriers were told. Careful consideration, it was pointed out, should be given to the economy of repairing track tools, such as welding ends on both ends of clay picks, welding claws on claw bars and other tools.

Rubber scrap should be saved and marketed so it can be kept in circulation to augment the available national supply, the instructions said, and reels and carts should be used wherever possible to avoid dragging hose.

Federal Ship Launches 3 Destroyers in 35 Minutes

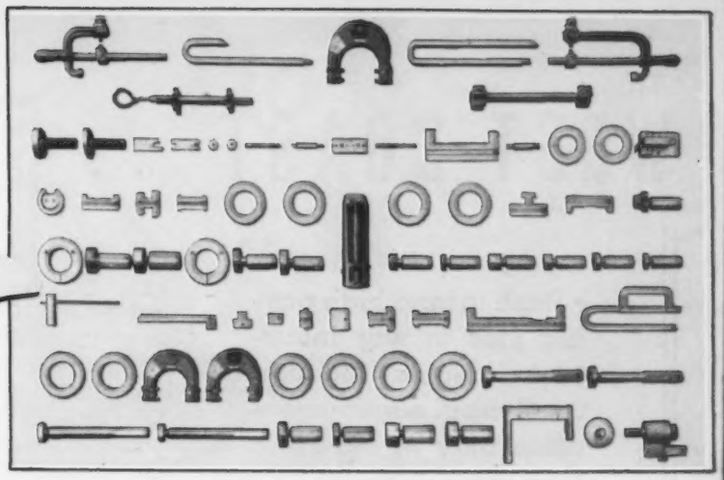
Kearny, N. J.

• • • **Three destroyers** in 35 minutes, the Navy's newest triple threat to enemy submarines, were launched here July 19 by the Federal Shipbuilding & Dry Dock Co., U. S. Steel subsidiary.



YOU CAN INSPECT PROJECTILES AND SHELL CASES THIS WAY

Checking each dimension separately and laboriously with its own fixed size gage requires many inspectors and lots of time. This set of gages was used in checking the critical dimensions of a 75 mm. shrapnel body.



But HERE'S A BETTER And A FASTER METHOD

This Multichek gage checks both tolerance limits on eight critical shell dimensions simultaneously—at just one pass and far more accurately than with fixed size gages.

In just one operation this gage checks the overall length of a cartridge case, two body diameters, one flange diameter, one shoulder height, one flange thickness, one counterbore diameter, one counterbore depth, and the primer hole diameter.

Write for a Descriptive Bulletin on the SHEFFIELD MULTICHEK GAGE

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DAYTON, OHIO, U. S. A.

SHEFFIELD GAGES MASTER GAGEMAKERS

WEST COAST . . .

• Rush to land high paying jobs in war industries creates inflation . . . Central employment office may be set up to help ease situation.

SAN FRANCISCO—In all the thundering as to whether or not general wage increases in heavy industries will cause inflation, everyone seems to have lost sight of the fact that mere expansion of personnel at current wages already has caused inflation.

In California the average worker in durable goods industries earned $47.26 a week during the month of May. The average shipyard worker earned $57.87 per week, and the average aircraft worker earned $44.44 per week. Contrasted with this, the average worker in non-durable goods industries found only $33.33 in his weekly pay envelope. If he worked in a fish cannery, he got only $18.47 or if he worked in a confectionery, he earned only $22.97. That is why the butcher, the baker, and the candlestick maker have all dropped their tools and gone to the shipyards and aircraft plants which have made California an important industrial state overnight. The situation is almost identical in Oregon and Washington.

As a result of this powerful drag on personnel by the shipyards and plane plants, there is a pronounced shortage of hotel workers, restaurant workers, building maintenance employees and others in the semi-skilled service industries. In San Francisco, where a few months ago blood spattered the sidewalks before a wage agreement was signed by restaurant workers and employers, the pay scale finally agreed upon now is proving to be a floor rather than a ceiling. The restaurant owners are paying premiums above the scale—if they can find anyone to take the job. Women are succeeding men as elevator operators, janitors, messengers, service station attendants, and transportation workers, and are receiving the same wages as their male predecessors. To the economists who fear inflation, the net result, whether or not the workers in heavy industry receive pay increases, the workers in light industry and service fields are receiving some tremendous wage boosts. Unless you agree with the contention that wages have nothing to do with inflation, the impact of these uncontrolled and undebated increases in the non-durable and service industries cannot be overlooked.

NOW, in California, 26 per cent of the workers are employed in light industry and 72 per cent in heavy industry, according to H. C. Carrasco, state labor commissioner, who is also the source of the figures quoted above. Since 1935 the state's employment has done a complete flip-flop. In that year only 39 per cent were in heavy industry and 61 per cent were in light industry.

Sudden recessing of the Aircraft Stabilization Conference in Los Angeles last Thursday came after representatives of the OPA and the War Manpower Commission, neither of whom was a direct party to the conference, got their signals crossed in announcements to the conferees. Now the government spokesmen will go into a huddle at Washington, D. C., where the stabilization meeting was scheduled to reconvene late this week.

In his official statement to the conference, Richard Gilbert, deputy OPA administrator, defined wage stabilization as meaning "no wage increases except to eliminate inequalities and sub-standard of living." He followed this up by declaring that pay scales of aircraft workers in the Los Angeles area and in the nation as a whole could not be considered "sub-standard." This point of view conflicts directly with the contention of labor representatives that the 60c. to $1.52 wage range in the industry, with an average hourly wage of 94.7c., is sub-standard. Mr. Gilbert's stand, if it is shared by Leon Henderson, means that the OPA is the newest convert to the belief that "wage stabilization" means "wage freezing." Like many other visitors to southern California, Mr. Gilbert must have gotten religion fast, for before the conference the strongest statement he would make was to the effect that any wage increases in the industry would have to come out of profits.

Unswayed by such evangelism, however, was Fowler V. Harper, deputy administrator of the War Manpower Commission, who held that inequalities in wage scales must be eliminated to prevent migration of the aircraft workers to the higher paying shipyards. Before the conference recessed, Mr. Harper had prepared a statement, which he never had an opportunity to make, to the effect that wage increases were required in the Pacific Coast aircraft industry.

AS A matter of strict fact, despite representations in the press that statements of either Mr. Gilbert or Mr. Harper were oracular neither was doing more than expressing an opinion of the agency which he represented. Nothing in the Price Control Act gives the OPA power to put a ceiling on wages, although it can put a ceiling on aircraft prices. A low price ceiling would act as a strong wage refrigerant but would not necessarily mean a solid freeze. The War Manpower Commission has even less authority, and although it may prescribe a wage increase, the industry is under no obligation to accept its doctoring.

On the middle road, Paul R. Porter, conference chairman, and WPB wage stabilization chief, declared that "no doors have been closed to wage adjustments. In determining the extent and scope of wage adjustments that may be made, it is the policy of the government to encourage collective bargaining, not to prevent it."

All three of these men would have been spared embarrassment had President Roosevelt issued a glossary with his speech in which he used the term "wage stabilization." Barring a more precise definition by the President before the conference reconvenes, the settlement of the "Little Steel" wage dis-

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cuts hardening costs from 16¢ to 1¢ per pin

● Today, the battle-cry of production is SPEED. Tomorrow, in the Battle for Business, it will be ECONOMY.

Why not get both, now, with TOCCO Induction Heat-Treating?

As for *speed:* TOCCO users report increases in output of as much as 600%.

And here is a typical report on TOCCO *economy:* Marmon-Herrington Co., Inc., Indianapolis, Ind., is hardening tractor track pins at a rate of 200 per hour at a cost of 1¢ per pin. Formerly pack-hardened at a cost of 16¢ per pin. TOCCO Jr., in assembly line, minimizes haulage. No sand-blasting required. TOCCO machine is always "on the alert," ready for instant hardening of any quantity of pins. Also, strength and life of TOCCO-hardened pins are greater.

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CLEVELAND, OHIO

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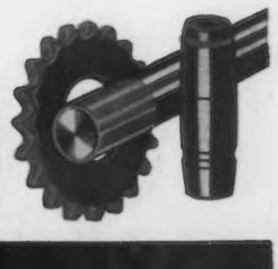


pute by the War Labor Board may have a profound influence on the final result of the aircraft negotiations.

The possibility that aircraft wage increases might be approved on the condition that labor "sterilize" them by agreeing to the purchase of bonds may be affected by the relative success or failure of such a promise by shipyard workers who nationally made such a pledge in connection with their wage boost. Although it is too early to make an accurate check-up, it is reported that, although they are keeping their agreement to the letter, they are using this commitment to replace rather than augment previous bond-buying pledges. If such is the case, they will have more cash to spend now despite the "sterilization."

AS pointed out earlier in this analysis, the effect of wage freezing in the heavy goods industries upon inflation remains semi-academic as long as employers are allowed to bid for workers in the less lucrative non-durable and service industries. To be effective, at least insofar as this Coast is concerned, any freezing or stabilization would have to include all wages and all salaries in every line of work. What officer of the government has the courage to ask for this?

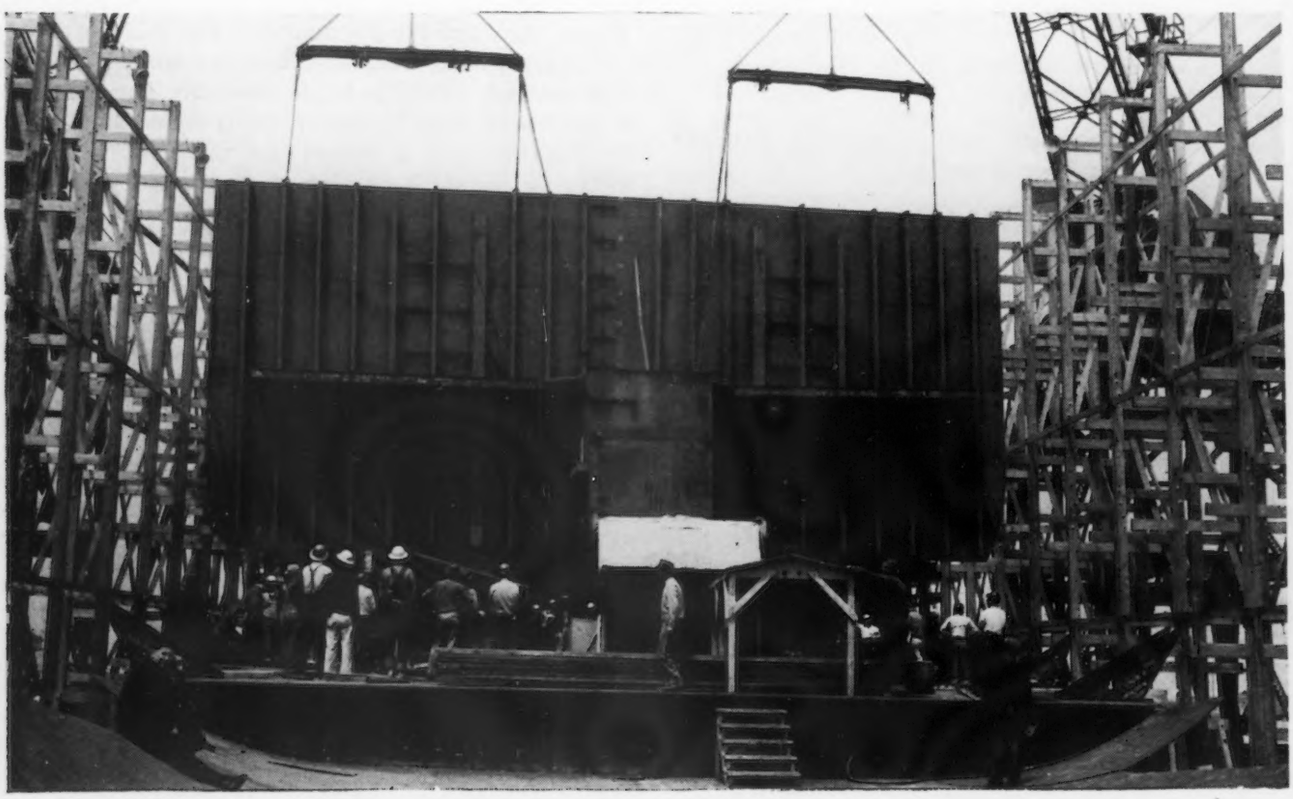
In a move to produce orderly personnel procurement in the San Francisco Bay region, where all Northern California shipyards are located, and to reduce peregrinations of workers from yard to yard, it is probable that a central cooperative employment office will be set up to supply workers for the principal operations.

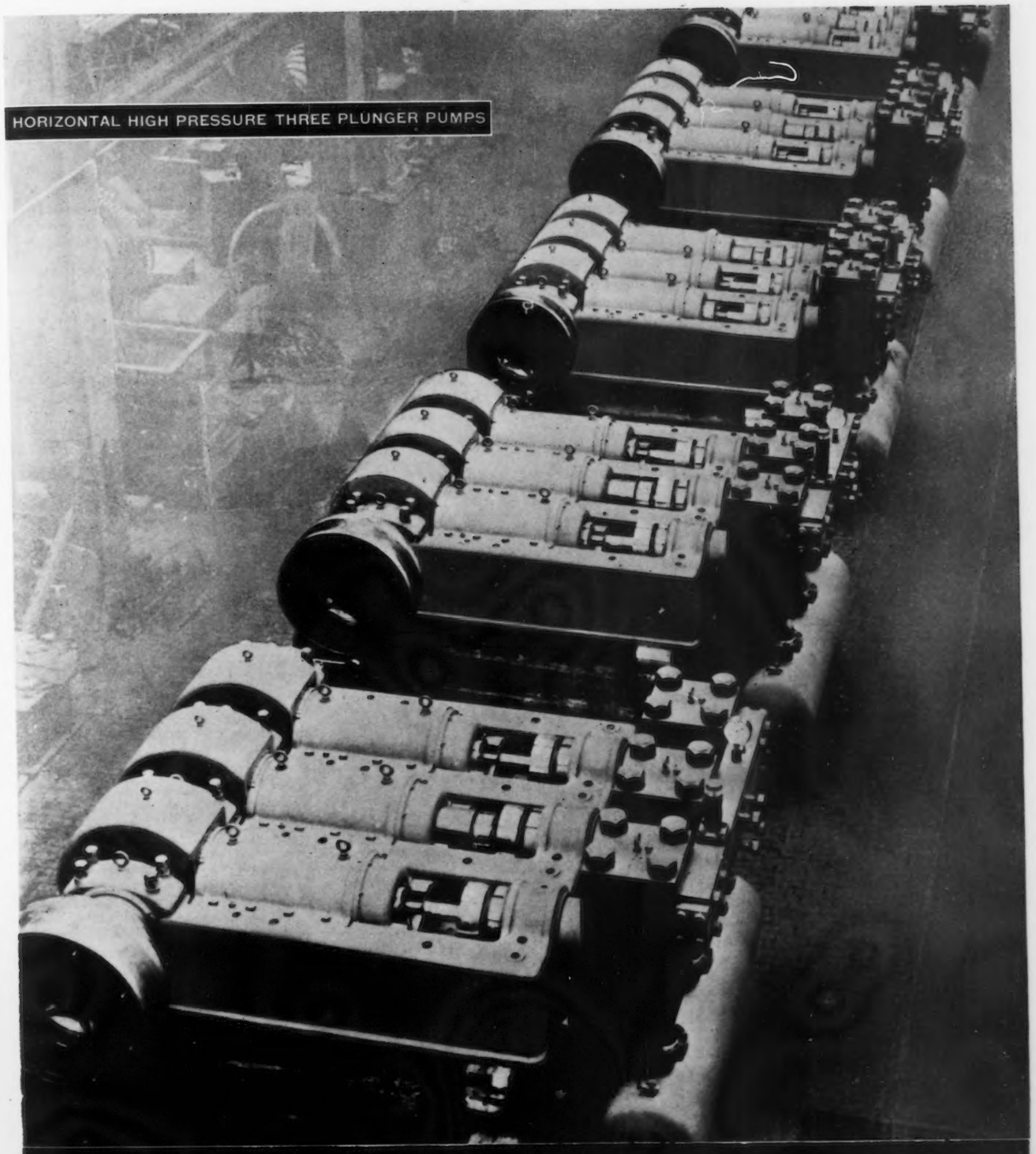
A similar central hiring office for aircraft workers has been in operation in southern California for nearly a year. Sponsored by the United States Employment Service, the office is located in downtown Los Angeles. As well as representatives of the personnel departments of each of the aircraft plants in the area union clearance representatives and Federal investigators who must approve all those hired are stationed there. The East Bay central office would operate on a similar basis for the shipyards and other heavy industries there.

Despite fears for the future, no serious labor shortages yet have occurred on the Coast. This may be attributed partially to lack of sufficient material and limited transportation to prevent plants from operating at full capacity. If material ever becomes plentiful, with more work in consequence, labor shortages will occur in inverse ratio. Although peak labor demands following plant expansions have not yet been reached, many believe that they are in sight. This reasoning is based on the recent freeze order on new plant construction. When plants now being built are completed and in operation, employment may cross the summit and job stabilization be attained of its own accord. This millennium is calculated to occur in from six to eight months.

In the Pacific Northwest, "purp" —as the Production Requirements Plan is familiarly known—is already beginning to burp insofar as the smaller machine shops are concerned. These shops contend quarterly quotas are not working out for them, and one small shop already reports using its entire quarter's allotment of tool steel.

SAVING TIME IN KAISER SHIPYARD: Ships are built in sections at the Kaiser yards in California. This photo shows the transfer of a bulkhead at the Richmond Shipbuilding Corp., in Richmond, Cal. Fabricated elsewhere, it is dropped onto the double bottom of the ship.





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Fatigue Cracks BY A. H. DIX

Backpatting vs. Roadwork

While these figures (the President said) give you some idea of our production accomplishments, this is no time for the American people to get overconfident. We can't rest on our oars. We need more and more, and we will make more and more.

The riot started among women in a waiting line at the grocery. Some of them started throwing out packages to the crowd when fighting started. Two policemen sent to the scene were killed.

—*Rockford Register-Republic*

The bewildering change of pace was caused by a paragraph about the Hamburg food riots being mixed up with a report of the President's recent remarks. We are not quoting this to magnify the *Register-Republic* make-up man's wild oats, but to emphasize the phrase, "this is no time for the American people to get overconfident."

It seems to us that we should have more of the same, and stronger, from the same source. When Elmer Davis gets into full stride he will doubtless request that our public servants not only sing in harmony but also warble the particular tune that will produce the proper national war-winning spirit.

So far there have been too many lullabies. To switch the metaphor, we feel that we, as a member of the public, have been handled the way a doting mother treats a not especially bright child. The contrast in what mother tells the child and what he is finding out from the gang on the corner is disconcerting. Mother should never run the risk of having her offspring get the impression that she herself does not know the facts of life.

On the one hand we have Representative May, chairman of the House Military Affairs Committee, predicting that the war will end "probably in 1942 and unquestionably in 1943," and on the other hand Supreme Court Justice William O. Douglas declaring:

> Overoptimism, though moved by patriotism, can readily burden our war effort with a disservice . . . By encouraging impractical and premature hopes, it can unconsciously and inadvertently minimize the long months of struggle and sacrifice that probably lie ahead.

As a news commentator Elmer Davis always had at least one foot on the ground and we will bet our new gasoline ration card against a ticket to the Canarsie Democratic Club's April 25, 1941 clambake that what gripes him the most are Pollyanna predictions and cartoons and text which create the impression that the enemy is a pushover. The war will not be won by reminders that Hitler's family is Schickelgruber and by showing the Japs in ridiculous postures that don't square up with the fine type in the inside pages.

We always were more impressed with Joe Louis' attitude toward his opponents than Charley McCarthy's. Healthy respect for an opponent discourages the skimping in muscle-building roadwork and makes the training table diet easer to stomach.

He Thinks We're Wonderful

• • • We have always been a little afraid of technicolored praise. It raises the pulse beat momentarily but there is always a following lag. The other day a Michigander told us:

> Your articles on manufacturing methods are the tops, and your priority service is the best ever. The Iron Age is indispensable to us and everyone in the industry should read every bit of it every week.

A 120-proof tribute like that produces the same quick glow that you get from a shot of week-old mule, and lasts about as long. We are more impressed with the quieter type of appreciation, like this one that came in the other day from a small Southern manufacturer:

> We regret to inform you that Mr. ....., owner of this business, lost his life in a tragic airplane crash . . . He set great store by The Iron Age.

He Was Wearing White Pajamas

With regard to your piece about words that are current in their negative sense but rarely used today in the positive, I recall that Christopher Morley used "maculate," meaning ***soiled.***

The same writer's most emetic piece of preciosity is his "I stood on the porch, ***candidate*** in pajamas." You know, of course, the derivation of the word.

—*Deac*

The "of course" was flattering but unmerited. But now we know that *candidate* means "clothed in white." The Romans required their applicants for public office to appear in a white toga when presenting themselves for election.

Tool Steel Skimpers

• • • In the April 16 issue we had an article on the cementing of high speed steel tips to carbon steel shanks. It seems to us the guvment has made it required reading for everyone with a war contract. The steady stream of letters reading "The Ordnance Department recommends that we read . . . " has exhausted our supply. So we are reprinting this and about a half dozen more of the recent tool-steel-saving-and-cutting-tool-life-lengthening articles in a 30-page booklet.

If you want a copy, send 20c in stamps and ask for "How to Lengthen Cutting Tool Life." In it is the leading article in this week's issue, telling of a treatment that is giving the Wright Aeronautical people as much as 20 times more pieces per grind than they got before.

It's Done With Mirrors

• • • A six-footer can see his full image in nothing smaller than a 3-ft. mirror.

—*Fatigue Cracks, July 9*

> Based on the belief that anything published in Iron Age must be accurate, I purchased a 3-ft. mirror to realize a lifelong ambition to see my full image, minus any gymnastics in the accomplishment thereof, only to be mildly disappointed to find the image shy an inch or so.
>
> My guess is that a bald six-footer would require a mirror one half his height, plus one half the distance from his eyes to the top of his pate. Having hair, I need a little more.
>
> —*F. B. Payson,*
> *J. H. Williams & Co., Buffalo*

Science sneers at hair. When performing the test pompadoured six-footers should get a crew cut and wear tight-fitting bathing cap. Our science editor assures us that regardless of eye level a 6-ft. figure can see his entire length, from stockinged feet to scalp, in a 3-ft. mirror.

Aptronym

• • • The manager of the King Tool Grinding Co., Cleveland, is a Mr. Sharpe.

George Sullivan of the brains department said a press release came in the other day from a publicity director named Sidney Bologna. But we don't believe it. Nothing is perfect.

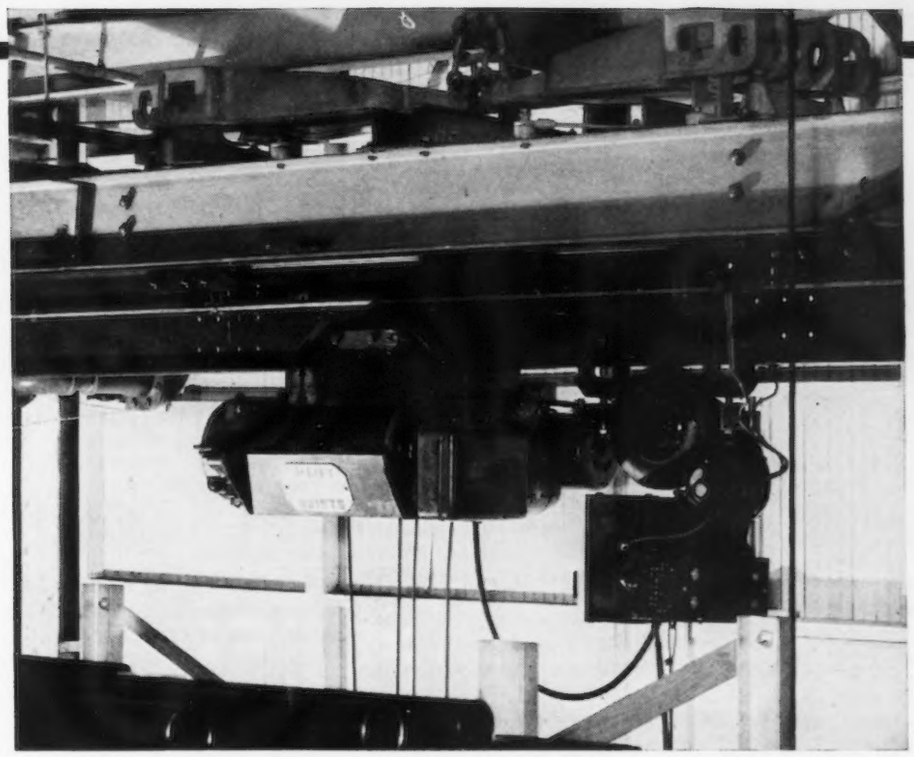
Puzzles

• • • Last week's messenger rode 56 miles. It's easy. To the square of the column length add the square of the distance marched. Find the square root; to it add the length of the column, and there you are.

As this is summer and as we are fresh out of tough meat for the master minds, here is a helping of hamburger that you can mentally masticate in 90 seconds:

If a quantity of two digits is tripled, and the digits added to the product, the result is the original quantity with the digits reversed. What is the original quantity?

How much time does your weighing cost?



This scale lever system, installed by Fairbanks, Morse & Co. on an overhead monorail conveyor, eliminates separate, time-consuming weighing operations.

WEIGHING, in your plant, may be costing precious minutes where seconds would suffice.

Fairbanks-Morse engineers know how to speed weighing with ingenious applications of modern scales. Let them recommend, for purchase by means of your priority, the kind of weighing equipment which will not only save time now, but also serve you best in years to come. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago.

FAIRBANKS-MORSE SCALES DIESELS MOTORS PUMPS

Dear Editor:

STEEL CEMENT

Sir:

It will perhaps interest you to know that we are still getting inquiries because of the first article on Cinch Steel Cement in your April 16 issue; several from Canada, one from Brazil and two from England. You may be pleased to know further that the War Department has instructed the Rochester, N. Y., Ordnance District to notify all contractors in that district of the results and economy that may be realized by the use of this cement. Furthermore, the Rochester district has asked for 100 reprints which went forward at once. So you see that THE IRON AGE is contributing greatly and directly to the successful prosecution of this war.

W. R. CHAPIN,
President,
W. R. Chapin Co.,
Indianapolis

Sir:

Will you please write me by return air mail, using the enclosed envelope, and tell me how I may obtain the April 16 issue of THE IRON AGE and also the price per issue, or if possible could you send a copy of that issue to me collect.

JAMES A. RITCHIE,
Superintendent, Munitions Div.,
Byron Jackson Co.,
Los Angeles

• We have no more copies of the April 16 issue. The demand for it was enormous, owing to the fact that the Ordnance Department seems to have recommended the article, "High Speed Steel Tips Cemented to Low Alloy Shanks" to practically every plant with a war contract. This and other recent articles on tool steel saving methods have been reprinted in a booklet entitled, "How to Lengthen Cutting Tool Life," price 20c. in stamps.—Ed.

PIG IRON DATA

Sir:

May we expect the data on furnaces in blast, as published by your magazine for so many years, to be continued in the near future?

E. L. QUIRIN,
Director of Economic Research,
Babson's Reports, Inc.,
Babson Park, Mass.

• Sorry, censorship rules have not permitted our publishing this information. The ruling has been changed, and we will again carry the figures.—Ed.

INDUCTION HEATING

Sir:

On page 57 of the May 28 issue, should not the copy on the Low Frequency Induction Heating Furnace have appeared under the title "Twenty Five Years Ago in THE IRON AGE," or some similar caption? Even the patents have run out, have they not?

E. J. RAMALEY,
Battelle Memorial Institute,
Columbus, Ohio

• True, it is rather old, but dry blast for blast furnaces is even older and just currently is a most active subject with most operators.—Ed.

Sir:

We are greatly interested in your article on industrial metal spinning in the July 16, 1942 issue, and would appreciate your forwarding by return mail c.o.d three additional copies of this magazine or article. May I also inquire whether or not you can tell me where I can get, in book form, additional information on metal spinning, and if so, the name of the books and the publisher.

H. A. BUHMAN,
President,
Wallace & Gale Co.,
Baltimore

• Aside from the three previous IRON AGE articles referred to, the only other printed information we know of is a booklet published by the Aluminum Co. of America, Pittsburgh.—Ed.

PIPE MANUFACTURE

Sir:

We are interested in the manufacture and manipulation of steel piping, both seamless and the ordinary commercial light or butt-weld quality. There appears to be a shortage of information on this subject here and so far as we know there has been only one book published recently concerning the manufacture of this product, and it deals only very generally with the subject. We were wondering if you can advise us if any books are obtainable on this subject in the United States.

T. C. BAUER,
Director,
W. H. Arnott, Young & Co., Ltd.,
Darlington, England

• Unfortunately, there is no book covering this particular subject. We suggest you consult the engineering index at your library to track down articles that have appeared in various technical magazines over the past few years.—Ed.

PRP

Sir:

Will you please forward to this office, three copies of "How to Operate Under the Production Requirements Plan."

HENRY RAU, JR.,
Chief, Materials and Conservation Section,
War Department,
Office of the Quartermaster General,
Washington

POWDER METALLURGY

Sir:

Some time ago, I read an article in your publication which referred to compressing powdered metal. We are now contemplating a job in connection with the armament program and it is quite possible that we may find it advantageous to use some parts made by this method. Have you any additional data on this subject?

E. KARFIOL,
Royal Lace Paper Works,
Brooklyn

• We have published a booklet on powder metallurgy which is available at 25c. a copy.—Ed.

GUIDE RUINED

Sir:

As a result of a severe storm, which broke a large window in our office, the Sixth Edition of the Priorities Guide, dated June 4, was utterly ruined. We would greatly appreciate it if you would be so kind as to send us another copy.

H. F. VOSS,
Treasurer and Purchasing Agent,
Voss Brothers Mfg Co.,
Davenport, Iowa

SPRAYED BEARINGS

Sir:

The June 25 issue carried a very interesting article on sprayed metal bearings, including a description of a new bearing that has an exceptionally low coefficient of friction. We should like to have further details of this if they are available.

R. MacDOUGALL,
Prince Castles Mfg. Division,
Sterling, Ill.

• Details can be furnished by Metallizing Engineering Co., 2107 41st Ave., Long Island City, N. Y.—Ed.

PLASTER MOLDS

Sir:

The writer has seen an article entitled "Plaster Molds" by W. A. Phair in the issue of Oct. 9, 1941. Please inform the writer if the above pamphlet is obtainable at this time.

R. M. LANGSENKAMP,
Langsenkamp-Wheeler Brass Works, Inc.,
Indianapolis

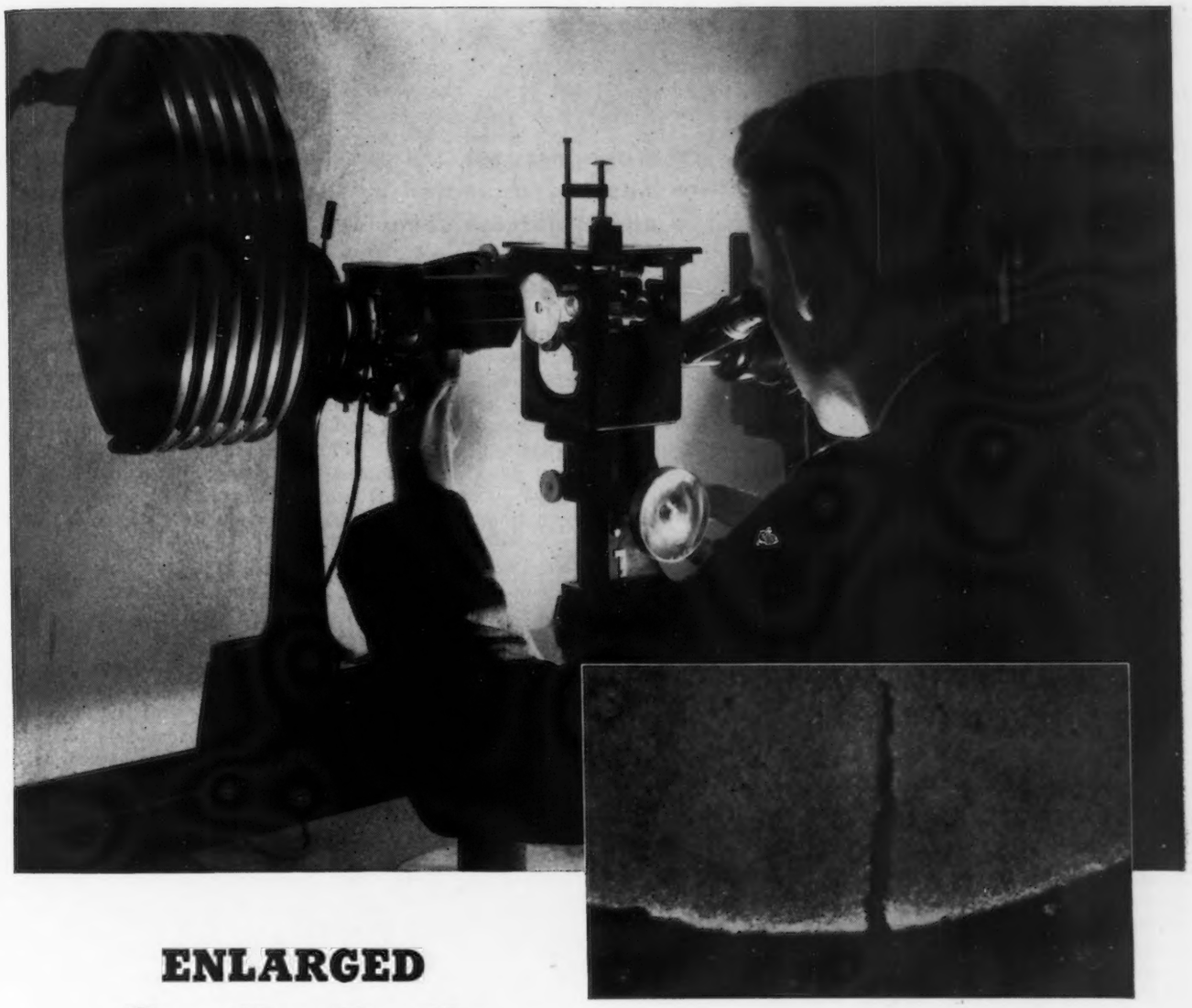
• A few reprints are still available.—Ed.

PRECISION CASTINGS

Sir:

After reading the article on precision castings in the July 9 issue, I enjoyed it so much that I would like to obtain six reprints if I may.

M. C. EVERETT,
Liaison Engineer,
Ranger Aircraft Engines,
Farmingdale, L. I.



ENLARGED 3,000 TIMES TO PREVENT SPRING FAILURE

Spring material must be as near perfect as possible. That's why Muehlhausen engineers use the Metallograph, illustrated above—to detect minute flaws.

Wire used in the Muehlhausen plant must undergo this test. A section of wire is mounted in a plastic mold and then polished. This specimen mount is placed in the Metallograph and photographed under high magnification. The developed print reveals the slightest interior fissure or surface crack.

This is only one of many tests customarily made by Muehlhausen engineers to insure quality in the art of spring making. Check with Muehlhausen on the design of any type spring — compression, extension, torsion or flat — hot or cold formed.

MUEHLHAUSEN SPRING CORPORATION
81[illegible] Michigan Avenue, Logansport, Indiana

MUEHLHAUSEN
MS SPRINGS
EVERY TYPE AND SIZE

FREE! SEND FOR INFORMATION

- New Die Spring Bulletin illustrates, describes 206 sizes and types of die springs.
- New Armament Bulletin shows importance of springs for many types of war equipment.

This Industrial Week . . .

- ***Wage increase and checkoff deemed inevitable.***
- ***Industry fascinated by sponge iron spectacle.***
- ***Alloy tightness demands new restrictions.***
- ***Tool life increased 2000 per cent by Wright.***
- ***Kaiser and Higgins dream of huge aircraft.***

THIS is the week a few shafts of industrial realism probed the dreamy confusion and dull delays of 150 weeks of war. Escapism is being pursued with, perhaps, a little less fervor, although a befuddled public continues to be titillated by gloriously colorful schemes for winning this war with the next war's equipment, and the enemy is repeatedly flabbergasted in today's battles by professionally skilled reports on next spring's production achievements.

That the CIO last week won a 44c. daily wage increase, maintenance of union membership, and checkoff seems only to be the inevitable result of everyone carving as much flesh out of the home front as the victim will bear, from the lowest suburbanite cynically dubious of inept scrap campaigns and chiseling on his gas ration, to the highest politicians breathing cheap patriotism and clutching special interests. It seems equally inevitable that labor intends to follow through with a long chain of wage and checkoff demands throughout the metals industry, to the tune of Presidential blandishment, curious and sinister accusations that industry does not dare oppose such demands while soldiers are dying at the front, the usual well publicized listing of executive salaries and corporation profits, and probably a juicy Congressional investigation or two, preferably several with high entertainment value with victims unable to fight back.

ON the floor side of the open hearth are men who continue to perform miracles in rapid furnace repair and production of quality steel with deteriorating scrap quality. This week, however, the necessity for extensive bottom and roof repairs and the cutting off of entire furnaces for complete re-builds have put the country's operating rate fractionally to 98.7 per cent of capacity, representing 1,676,500 tons of ingots. Even at this rate the average output continues to expand upward at a 1600-ton weekly pace. The drawing on continuous mills and the impact of new plate mills are now giving increasing relief to the plate deficiency, the result being an incipient tightness in other types of steel, which, in turn, is causing a scramble for double A priorities for those types. What with probably a permanent war-time shift away from sheets and strip, a number of mills now have idle rolling capacity, and at least one steel producer has been prompted to negotiate with an aluminum company to lease part of such equipment.

The ferrous industry is increasingly cursed by two gnawing aches, scrap and alloys. These two grim problems are the common threads running through a current series of seemingly isolated technical and commercial developments.

One such development is sponge iron, an age-old iron ore reduction process into which has been breathed the fire of youth and which has been presented in a weird manner as a quick and sound way to offset the scrap scarcity (see p. 81). The problem is red hot politically and is being drummed up to the stature of a *cause celebre* and the steel industry is trying to dodge vicious rabbit punches, while at the same time watching the spectacle with the fascinated unbelief of Sancho Panza witnessing Don Quixote charging the windmill. Any superiority of sponge iron production over conventional blast furnace practice has always been established on an emotional rather than a technical basis, and there is every likelihood of plenty of burned fingers before the current hysteria runs its course.

Recognizing that quality scrap for electric furnace operation will assume serious proportions this fall, at least one steel producer is creating a new plant to detour this difficulty by means of a triplexing operation, unique in so far as this country is concerned. Poor quality and more readily available scrap will be melted in foundry cupolas, the molten iron being desulphurized in the ladle. This desulphurized metal is then blown in a Bessemer converter, and the resulting steel dephosphorized chemically, and this steel then is charged hot into an electric furnace for finish refining. A similar technique, only without a finish refining in an electric furnace, is gaining momentum as a means of quickly bringing gray iron foundries into the war production program and at the same time alleviating the chronic shortages in steel castings which have repeatedly interfered with the tank program and caused frequent delays in aircraft, ship and ordnance construction. The plan has the added advantages of tapping a skilled and available labor pool, requires no new buildings, adds no new burdens on builders of electric furnaces and no new loads on electric power facilities.

WITH the critical position of certain alloying elements becoming so obvious, the industry is on the threshold of a series of metallurgical innovations that will tax the ingenuity of all concerned. A group of National Emergency steels, of low alloy content is now replacing conventional and more highly alloyed steels. About 15 per cent of current alloy steel production falls into the NE classification, and this proportion will rise fairly rapidly over the coming months as the Army, Navy and Air Corps of necessity ease up slightly on many specifications. But even with a growing adoption of NE steels, and assuming complete recovery of scrap (a highly optimistic presumption), there will be barely enough nickel, molybdenum and vanadium to squeeze through the 1942 production program. Obviously, therefore, even before full adoption of NE steels runs its course there must be a further writing down of alloy content in many of the steels

and even a full shift to straight carbon steels for certain other steels. The current shift to NE steels is not too severe a hardship as it represents in many instances only a wiping out of extravagant habits, but the shift to carbon steels will require some very clever foot work, and will follow the same pattern and encounter the same difficulties as did a similar change in Germany before the war.

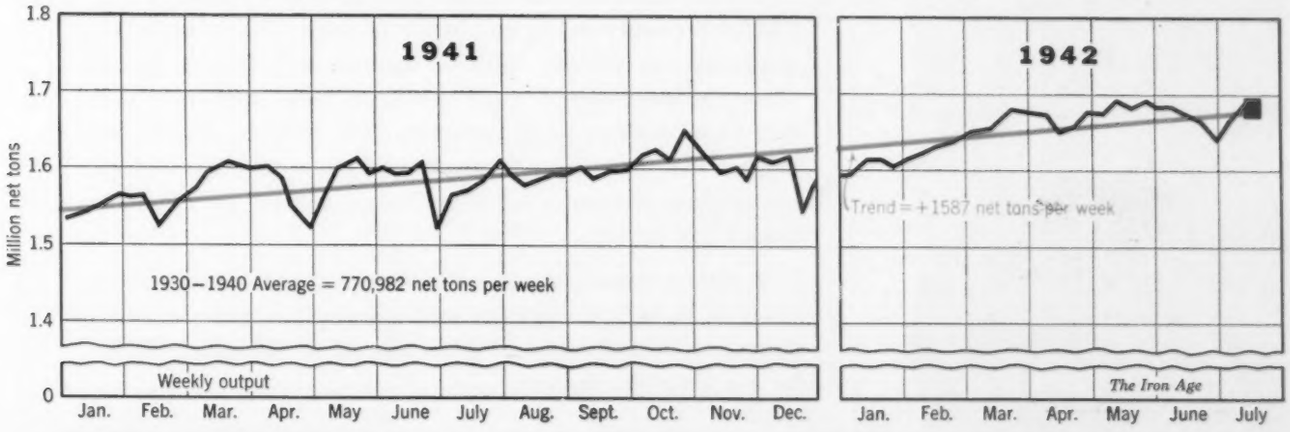
Considerable saving in alloying elements required by tool steel should follow the spectacular new development devised by Wright Aeronautical Corp. and described herein (p. 33). This company has developed a technique of grinding tools that has resulted in enormous increases in tool life—20 to 40 times in some instances. These gains have resulted from the substitution of machine-ground tools for rough hand-ground tools the use of a novel form of chip breaker groove to break up long wiry chips and the use of extremely fine finish on the flanks of the tool point and in the chip breaker groove itself.

AMONG metal consumers, the aircraft and shipbuilding industries continue to occupy the center of attention. The aircraft industry particularly is being pushed around by the imaginative. A year ago the beryllium plane was the darling of the armchair engineers, a month ago the magnesium plane was dished up with brilliant adjectives, and today Seversky is speaking of enormous fleets of superbombers and Kaiser is echoed by Higgins in hitting the headlines with suggestions for converting shipyards to the construction of super-flying boats. Such breath-catching pictures serve to ease out some of the bad headlines, but follow the so very familiar pattern of winning this war with the next war's airplanes, and hurdle with great ease the question of material limitations.

The industry may dream of enormous planes but right now is sweating through the prosaic problems of re-designing wings on fighter planes to carry the multiple cannon so essential in dealing with enemy bombers. And only recently, after serious delay, have gun turrets been worked into the comparatively old B-24 and Flying Fortress designs. The one-per-hour production of B-24's at Willow Run is enjoying lavish publicity in England after running its course here, but the discouraging fact is that Willow Run won't be in production for months, and the program for the very heavy bombers that will carry the real wallop in this war—one and one-half times as large as the usual heavy bomber—is characterized by serious delay. Therefore, talk of clouds of superbombers and super-transports rising from shipyards is exceedingly confusing because of the material and time factors involved, not even mentioning the total dissimilarity of airplane and ship construction technique.

An expanding air freight program, of course, is well under way, and every indication points toward limitation of planned bomber production in favor of transport production. Of particular significance in this field is the new plant under construction by Edward G. Budd Mfg. Co. for the fabrication of two-engine stainless steel cargo planes. Such use of stainless steel is a radical departure from existing practice anywhere in the world, and will not only help conserve the aluminum supply but will supply data for partial use of stainless steel on the very heavy bombers previously mentioned. Furthermore, Budd will use a relatively high carbon stainless which can be from scrap and therefore will make no demands on virgin nickel. The Stout design for a stainless plane has fallen by the wayside; the Watters design of Budd will be of conventional lines, with a tricycle landing gear, and a belly door which drops down to form a ramp for handling vehicles.

In shipbuilding it is being found that as plate inventories are built up in the yards, production speeds approximate a ship per month per way. Realization of this fact, plus additional realization that projected plate capacity will be hard pushed to supply such inventories has prompted the Maritime Commission to cancel a 200-ship order to Higgins Industries, the proponent of assembly line production of ships. A storm is now raging regarding this cancellation, amid dark accusations of the malefactions of steel interest plus the usual threat of a Congressional investigation. Even though there has been understandable skepticism regarding the merits of sliding a 10,000-ton ship along an assembly line, a belated realization of limitations in steel production obviously ruled the cancellation. Higgins' statement that the Vera Cruz Steel Co., Mexico, has offered to supply the steel confuses the issue in that the Vera Cruz concern must be so small as to be unknown here. There is no plate rolling capacity in all Mexico, and tentative negotiations for a plate mill for the Monterey plant could not possibly reach completion and delivery for well over a year.



Steel Ingot Production by Districts, Per Cent of Capacity

	Pitts-burgh	Chi-cago	Youngs-town	Phila-delphia	Cleve-land	Buf-falo	Wheel-ing	South	De-troit	S.Ohio River	West	St. Louis	East	Aggre-gate
Week of July 16...	98.0	102.0	98.5	95.0*	98.0	106.5	86.0	99.0*	98.0*	105.0	105.0*	108.0	76.0	99.0*
Week of July 23...	98.0	102.5	99.5	92.0	100.0	106.5	86.0	98.0	96.5	105.0	102.0	108.0	85.0	98.7

* Revised

Increase HAULAGE SPEED
Lower HAULAGE COSTS
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Porter Fireless Steam Locomotives give you SOMETHING EXTRA for every dollar you invest in them. New, unskilled workmen can quickly learn to operate and service them. They reduce haulage costs because their operating and maintenance expense is extremely low—made possible by the fact that there are no complicated parts, no diesel, electric or other motors in a Porter Fireless. They are refueled during idle periods.

If steam is available in your plant, a Porter Fireless can save up to 50% in haulage and switching costs. Built in direct and geared types, in sizes from 10 to 100 tons. Write for complete information.

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PITTSBURGH PENNSYLVANIA

Sponge iron plants are large. This is Goro Matsukata's plant at Kuji, Japan. Planned output was 100 tons daily. In 1927 Goro said he would be successful or go broke. Goro went broke.

News of Industry . . .

Washington Prods Under Tombstones In Graveyard of Sponge Iron Processes

• • • **It's been a tough** fortnight for many a steel man. Senator O'Mahoney has been digging around in the family graveyard, exposing to harsh daylight the pitiful, defunct enthusiasms, expensive experiments, high hopes, brutal disappointments and revolutionary sponge iron ideas of the late '20's. The shock of reawakened memories, bad as it is, is in no way alleviated by the Senator's sinister accusation that the brat was lured out back of a blast furnace and brutally throttled so he would never develop as a threat to his elders.

Sponge iron is made by a so-called direct process, a quite easy practice that was carried out with some success by primitive man, and on occasion showing a flutter of life for 4000 years thereafter. It was in the period 1927 to 1930 that sponge iron technology really awoke with a quick start, shot to a furious crescendo, and thudded dully to earth when financial backers become no longer willing or able to lose money. Of a literally incredible number of "new" processes to choose from, a number worked pretty well, and any one seemed to show a handsome profit on paper. But in the enormous graveyard of sponge iron processes, death is attributed on each tombstone to very high costs, with quality complications.

See J. H. Van Deventer's Editorial "Spongers," on page 31.

It was in the period 1927 to 1930 that the National Tube Co. completed an extensive plant at Lorain, Ohio, to make sponge iron by the Hornsey process, previously tried out in England; the direct steel processes of Pherson-Prentice and the "Carsil" method in England appeared promising; Goro Matsukata sank all his yen in the Thornhill-Anderson process for his Kuji (Japan) steel mill; Hoeganaes-Billesholms Co. of Sweden made commercial iron after constant experimentation for 20 years; Eisenschwammgesellschaft G. m. b. H., Bachum, Germany, opened a small sponge iron plant to supply metallics for steel production; and innumerable other schemes were financed or discussed. All these methods and the colorful history of sponge iron are described in THE IRON AGE, Feb. 17, May 5, April 7, March 17, Sept. 1, Oct. 6, Dec. 1, 1927; May 17, 1928; Jan. 31, March 21, June 6, July 4, 1929; March 13, March 20, 1930; June 4, 1939; Jan. 28, 1932.

Today, only one plant in the world is operating, that at Hoeganaes, Sweden, which turns out about 30,000 tons of material. The continued operation of the Hoeganaes plant is attributable to a variety of special local conditions, the product made sells for a relatively very high price, and throughout the remainder of Sweden the steel industry is based on, and increasing scrap shortage is taken care of by, conventional blast furnaces and by ore reduction in electric furnaces.

Reduced to its simplest terms, all conventional blast furnaces are in themselves sponge iron furnaces. Practically all the iron ore is reduced at below the melting point of iron in the stack of the furnace by the rising blast. In a blast furnace the stack rests on the bosh, which is the section just above the tuyere line, wherein the reduced iron finally assumes a pasty and then a molten condition. All slag is then run off through

The Low-Down in Six Nut Shells

Approximately 12,000 words of testimony were submitted by Hon. Joseph C. O'Mahoney, United States Senator from the State of Wyoming, before the Senate subcommittee investigating industrial alcohol and synthetic rubber, on June 23. The testimony can be fairly well abbreviated as follows, quoting Mr. O'Mahoney:

TECHNOLOGY: "Sponge iron is the name given to the iron which is produced by melting iron ore in a roaster instead of in a coke oven. The process produces iron wholly free from carbon and which, because of that fact, is ideally suited to the manufacture of the highest type of steel."

PROBLEM: "Scrap iron and steel are needed for the manufacture of steel only because of the comparatively high degree of carbon contained in pig iron manufactured by the coke-oven process. Only a very small amount of carbon can be permitted in the high-grade steel which modern warfare demands. As a consequence, the mixture from which steel is manufactured consists, I am advised, of approximately 30 per cent pig iron and 70 per cent scrap. It is because we do not have enough scrap that the production of steel is not sufficient to meet our war needs."

SOLUTION: "Sponge iron is the substitute. I am advised that plants for the production of sponge iron can be constructed in such small units that they can be built at the mouth of every iron mine in the country."

LOCATION: "Deposits of iron ore are to be found in various parts of the West. Specifically, I want to call attention to the . . . deposit of iron ore in Iron Mountain within 50 miles of the capital of my State, Cheyenne."

VILLAIN: "United States Steel Corp. . . . did attempt in 1939 to develop the sponge iron process at Lorain, Ohio. . . . Naturally, one wonders why a process of that kind should have been abandoned. . . . The answer that is given is that the sponge iron process, as indicated in the statement which I have made today, is such that it can be utilized in small units as well as in large units, and that reduction plants could be constructed at the mouth of every iron mine in the country. Obviously, if that were done, the concentrated control over the steel and iron industry which is now exercised would not be possible."

PENALTY: Statement by Senator Truman—"We are in the midst of an investigation right now, Mr. Chairman, on sponge iron, and will hold some public hearings within the next 2 or 3 weeks. There is plenty of evidence, so far as we have gone, that it is being suppressed."

one tap hole and the molten pig iron is tapped from another hole. Sponge iron proponents, therefore, visualize reducing iron in what is essentially a stack of a blast furnace by means of gases, and securing a granulated or spongy end product.

The entire problem of sponge iron versus pig iron as a metallic for steel making has been resurrected by Senator Joseph C. O'Mahoney by means of extensive testimony before a Senate investigating committee. His insistance is that sponge iron is practical, offers a ready relief to the current scrap shortage, costs are lower and quality higher than for pig iron, etc., etc. The Bureau of Mines has been given $600,000 to experiment with the process, and the WPB is under pressure to release material for the construction of many sponge iron plants, perhaps one at every iron ore pit.

The WPB has asked the National Research Council of the National Academy of Sciences for a report on sponge iron in order to guide the WPB for future action. The Research Council's report shows the following conclusions:

(1) "The sponge iron process is not new. Having been available basically since before the adoption of the blast furnace and the open hearth, and having been before the iron and steel industry in its present form for over thirty years.

(2) "One primary reason for the inferiority of the sponge iron process is that it is not adapted to such large size units as are the present commercial processes. Also, the necessary automatic materials handling devices, so highly developed and efficient in the present process, are not developed and are not likely to be developed until after many years of operation.

(3) "The iron blast furnace and coke oven not only handle tremendous tonnages of ore, flux, and coke and use a remarkably small amount of labor, but they require practically no repairs over long periods. From experimental results, however, one is justified in assuming that sponge iron furnace repairs will be very frequent and costly in materials, labor and supervision.

(4) "Sponge iron would represent a poor substitute for scrap as it is inferior in many respects, a few of which are:

a—Sponge iron is finely divided and porous in nature and hence, is more readily oxidized in the open-hearth furnace. Briquetting to overcome the fineness of division creates an additional operation requiring more labor, materials and equipment.

b—Sponge iron, even when made from the purest iron ores available and when reduced by hydrogen, contains more impurities, e. g., silica, alumina, sulphur and phosphorus, than steel scrap. Iron ores pure enough to warrant the use of sponge iron in the steel furnace are not available for this use.

c—The less pure ores that might be available for the sponge iron process would produce a product high in slag-making constituents requiring excessive use of fluxes, refractories, fuel, labor and ferro-alloys which would make its use decidedly unwise in present steel melting operations.

d—Unfortunately, the requirements for large amounts of cheap gas and pure ores cannot be met in any one locality. To make use of the large amount of natural gas available in Texas, only the very impure Texas ores could be used.

e—If coal instead of gas is used as a reducing agent, still more slag-making impurities such as silica, alumina and sulphur are introduced, making the sponge iron less suited than ever for conversion to steel.

f—These observations are true for electric melting furnaces as well as for fuel fired open hearths.

(5) "Whereas sponge iron, as outlined in 4 above, is less satisfactory than steel scrap as a melting stock for steel production, scrap is less satisfactory than pig iron. Numerous facts attest to this:

a—The steel industry pays more for pig iron than scrap.

b—The use of pig iron speeds up the steel-making process.

c—It is cheaper to handle pig iron, whether solid or molten, than scrap.

d—The claim often made that sponge iron, being low in carbon content, is purer and better than pig iron, is contrary to the facts. The slag-making impurities in sponge iron are costly to handle and the low-carbon content is no asset.

(6) "From the viewpoint of efficient use of raw materials also, pig iron is superior to sponge iron. The by-

product coke oven and the blast furnace both make use of all the raw materials going into them.

(7) "Because no accurate detailed estimates of the cost of commercial sponge iron plants have been made, one is not justified in comparing plant costs of the sponge iron process with the conventional blast furnace process. However, the blast furnace has the theoretical advantage of lower cost and lower over-all requirement of construction materials because of its larger scale of operation.

(8) "Re-examination of the sponge iron process from these angles shows definitely that the process, which has never been operated satisfactorily on a large scale in this country, presents no advantages that would warrant its development at this time. Devotion of time of the nation's production personnel to further attempts to commercialize this process would be wasteful.

(9) "The steel-making process as practiced in this country is so highly mechanized and efficient and carried on in such large units that the adoption of the small-unit sponge iron process, not possessing mechanical handling equipment and not readily adapted to use it, would be a step backward in our efficient utilization of labor and materials.

(10) "The undertaking of a program to produce sponge iron to supplement the supply of iron and steel scrap is inadvisable because even though sponge iron would serve as a poor substitute for scrap, it would do so at the expense of labor, furnace capacity, fuel and other essential raw materials. The net result would be a loss rather than a gain in over-all production.

(11) "If, as a result of a scrap shortage, open-hearth furnaces became idle, then the steel plants would use sponge iron, if it were available, in spite of its disadvantages. If the establishment of the sponge iron process requires diversion of materials of construction from essential uses such as ships, blast furnaces, aluminum plants, etc., then the value of the availability of sponge iron would be counteracted by loss of production in other places.

(12) "The sponge iron process is not established on a commercial size scale, and experimental demonstrations have not proved that large operations can be established with certainty in any given time.

(13) "The blast furnace production of pig iron is a long established operation, efficient in use of labor, raw materials and by-products. Its product, pig iron, is the most satisfactory form of iron from which to make steel. Hence, additional iron to supply the nation's steel requirements can best be made by the production of pig iron in the conventional blast furnace.

(14) "There are so many unfavorable aspects to the sponge iron process that its development would appear to be a retardation of the over-all war effort. Diversion of our pure iron ores, diversion of electric furnace capacity or of materials of construction, diversion of raw materials, labor and energies would be a high price to pay for the development of a substantial production of sponge iron whose utility is so questionable.

(15) "The undertaking of a large research and development program for the production of sponge iron as a substitute for scrap is inadvisable at this time. Research and development are justified, however, for the development of a suitable process for making powdered iron for use in the new 'powder metallurgy.' Since the requirements for powdered iron are measured in thousands of pounds and the current price 10 to 12 cents a pound, processes similar to the sponge iron process should apply. Such a program of investigation is now under development for the War Production Board."

SPONGE IRON AFTER BRIQUETTING: This iron was experimentally made in 1929 by the W. H. Smith process at General Reduction Corp., Chicago.

KING'S EYES POP: Either King Peter of Jugoslavia is open mouthed with amazement at Detroit production methods or the publicity photographer has been particularly adept. The picture was made at the U. S. Naval Ordnance Plant, operated by the Hudson Motor Car Co., which is turning out Oerlikon anti-aircraft guns.

41 Years of Service to the Steel Industry

In 1901, the year the United States Steel Corporation was formed, the Charles Dreifus Company had its beginning.

That period of 41 years embraces the tremendous expansion of the American steel industry—from an ingot capacity of 24,000,000 net tons in 1901 to one of 90,000,000 tons today.

The Charles Dreifus Company, as a broker in iron and steel scrap, still has as its customers some who were its customers 41 years ago (or their successors). We are proud of this record.

Steel companies and scrap producers, as well as such Government agencies as the War Production Board, the Office of Price Administration and the Army and Navy, recognize the important role of the scrap broker in keeping the iron and steel industry operating at a rate that will bring a speedy and victorious conclusion of the war.

We solicit further opportunities to be of service in the movement of iron and steel scrap from industrial plants, railroads and scrap yards to steel plants and foundries.

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Buick Turns Out Steel Shells by New Process

Flint, Mich.

• • • **Steel shell cases,** which have successfully passed all ordnance tests, are being turned on a constantly increasing production basis by a process developed by engineers of the Buick Motor Division of G. M., in cooperation with the Army Ordnance Department, officials of the motor car company have disclosed.

The Buick process, according to Harlow H. Curtice, head of the Buick division, has been applied to several sizes of artillery shell cases for the Army, including anti-aircraft shells. He said the process is applicable to all larger caliber shells and has been made available to the government for use by other manufacturers.

The method, Mr. Curtice said, requires no special steels or critical alloys, nor does it present a machinery or equipment problem. Existing facilities of munitions makers can be utilized, he said.

Development of the Buick process started last fall and involved considerable experimenting with one-third size dies. As experience was gained from these smaller dies, the experiments were carried into full size dies. The Buick engineers worked with a special ordnance industry committee under Maj.-Gen. L. H. Campbell, chief of Army Ordnance. Development of effective drawing heat treating methods at Buick was under the guidance of R. B. Schenck, chief metallurgist, and Rex Glover, die specialist assigned to the process.

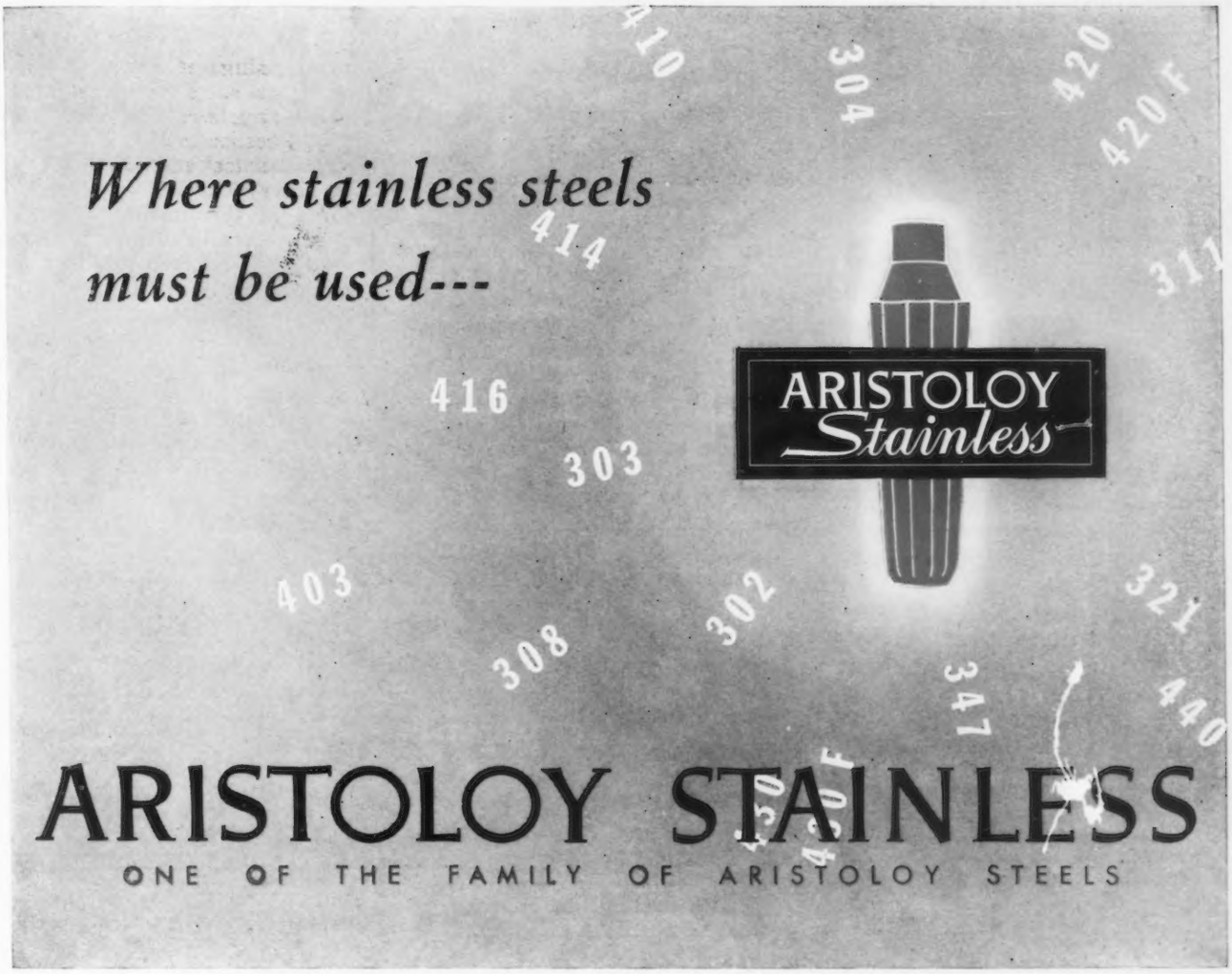
Mr. Curtice reported that the new steel cases had proved capable of withstanding the high pressure of gun fire, were easy to load and eject from the gun chamber, met the requirements of both hot and cold guns, and were free from spark hazard and obturation.

The development of the steel case, in which the technical skills and facilities of a large group of manufacturers have been made available to the Army and of which the Buick process is one result, is considered a major contribution to the war. Use of steel cases is expected to save close to a million pounds of copper a year.

Pittsburgh Firm's Employees Exceed 10% War Bond Pledge

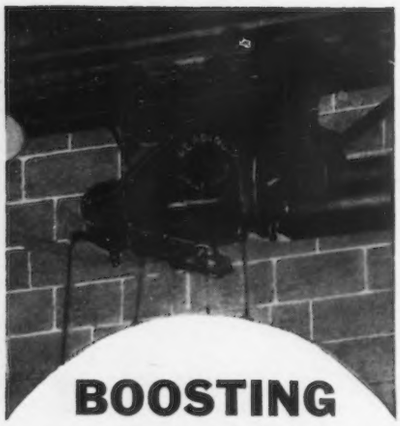
• • • **The U. S. Treasury's** War Savings Staff on July 17 notified Theodore F. Smith, president of Oliver Iron & Steel Corp., Pittsburgh, that it was the first firm in Pittsburgh to exceed the 10 per cent pledge for the purchase of war bonds on the payroll deduction plan.

DISTRACTING YOUR ATTENTION: The camera man was trying for "cheesecake" effect, but at extreme upper right the cannon on the British Spitfire adds a note of realism to this casual scene at Allegheny County Airport, Pittsburgh, during a war bond campaign. All told, there's a lot of "oomph" in the picture.



To conserve nickel and chromium, all industry is cooperating to limit the use of stainless steels to vital applications where only stainless will do the job. For such applications Copperweld Steel Company is furnishing Aristoloy Stainless steel bars and billets. We'll be glad to discuss your stainless steel applications with your engineering staff.

COPPERWELD STEEL COMPANY **WARREN, OHIO**



BOOSTING

Production's Heartbeat!

Here are three ways that Reading Electric Hoists are helping to boost output and make industry's conversion to Wartime work less costly:

1. In one power plant, a single Reading ½-ton Electric Hoist helped boost boiler capacity by ⅓, making new building construction unnecessary.

2. The ½-ton Reading Hoist shown here is saving considerable time and money by providing almost "automatic" stoking of the furnaces.

3. In another large industrial power plant, a $2,200. Reading Hoist installation actually *saved* a total of $3,878. *each year* for 12 years!

When *results* and *savings* are in your specifications, it pays to rely on Reading's engineering ability.

ASK US to mail you a copy of "144 Answers to Your Hoisting Problems" — an interesting booklet to help you solve your specific problem.

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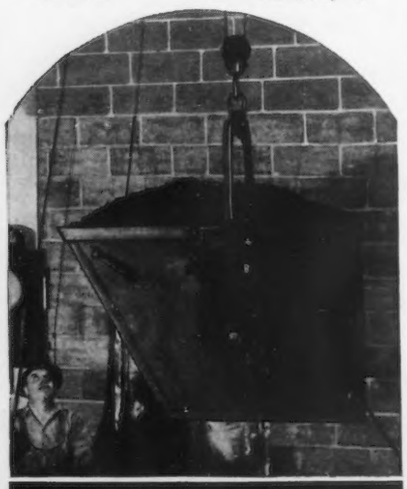


READING
Chain Hoists, Electric Hoists, Cranes and Monorails

Scrap Drive Must Win, Government Warns

• • • **As the steel industry's** huge advertising campaign opened this week, government sources predicted that unless the current scrap collection drive is successful, the last quarter of 1942 and the first quarter of 1943 will see a scrap shortage of approximately 5,000,000 tons. This shortage is expected, although shipments of purchased scrap for the first six months of this year have amounted to nearly 12,000,000 tons.

Nor is the shortage going to be wiped out by reason of the collection of rising quantities of automobile scrap. This bulge in recoveries from old cars, however, is a source of gratification to WPB which last week said that automobile graveyards are b r e a k i n g records in the amount of scrap they are turning over. In June these yards produced 453,768 tons, an increase of more than 300,000 tons above the 1941 monthly average.

It is said that cast scrap is the only grade of which there is at present a sufficient supply. All other grades are in critical conditions, and various reasons are ascribed for this.

FIRST OF STEEL INDUSTRY'S SCRAP ADS: With an appropriation of $1,500,000 for advertising, the steel industry this week enters the drive for more scrap. Separate series of advertisements have been prepared for newspapers and general magazines; industrial publications, and farm papers. Here's the first one in the industrial paper series, starting this week. The advertisements are prepared by McCann-Erickson, Inc.

An Emergency Statement

to Industrial Executives

Manufacturers—large and small—have a special opportunity to aid the war effort—over and beyond the contribution they are already making.

That opportunity is Salvage.

No matter how much scrap is dug out of the attics and basements of homes, the fence corners and gullies of farms, war production factories will still fall far short of the scrap material needed unless the manufacturers of America get 100 per cent behind the program.

Six million additional tons of scrap iron and steel alone, as well as vast quantities of rubber and other materials, are urgently required to bring our war program to full strength.

Whether you are a lace curtain manufacturer or a maker of drop forgings the obligation is the same.

The job is more than simply collecting scrap material around the plant, or turning in the scrap which is created on the premises. It is a job of condemning obsolete machinery, clearing out unusable stocks, obsolete tools, dies, drills, fixtures, etc.

All unusable material, equipment, and stocks should be scrapped at once and put back into war production.

The philosophy of "It may come in handy some day" must give way to the doctrine of "My country needs it now."

Patriotic volunteer committees of executives are already hard at work on this problem in 421 industrial centers.

The Industrial Section of the Conservation Division has a corps of technical advisers who are prepared to work with all types of industries.

A thoroughgoing Salvage program in a factory can not only help meet the present emergency, but can help prepare that factory for its postwar operations through the elimination of once wasteful practices.

1 The first thing to do is to put some one individual in charge of Salvage in all departments of your business and give him not only the responsibility to act, but the authority to act.

2 The next thing to do is to get in touch with your local Industrial Salvage Committee and map out a detailed program with the materials and ideas that are available. Their program contains 17 simple steps.

If in any doubt, write or wire at once to the Conservation Division, War Production Board, Railroad Retirement Building, Washington, D. C.

This job is being tackled by a democratic nation through the volunteer efforts and initiative of democratically managed industrial concerns, rather than through directives or compulsion as it is done in Axis countries.

Every executive, every superintendent, every foreman and every worker in every plant can help.

The main thing is to get started now

Allowable material, equipment, and stocks should be scrapped at once and put back into war production. Please read this message and act upon it.

D. M. NELSON, CHAIRMAN, WAR PRODUCTION BOARD

This message approved by Conservation Division

WAR PRODUCTION BOARD

This advertisement paid for by the American Industries Salvage Committee (representing and with funds provided by a group of leading industrial concerns).

SCRAP FROM HOMES AND FARMS—As individuals, search your home from attic to basement. Search your garage. Look at the old familiar things in a new light. Do you need them—or can you get along without them? Your country needs every pound of scrap iron and steel, other metals, rubber, rags and burlap to provide the fighting materials our armed forces must have. Take your scrap to the nearest Salvage Depot—give it to a charity—or sell it to a Junk dealer. If you live on a farm, consult your County War Board or your farm implement dealer. In any case, your scrap will flow back into the blood stream of our war production.

Holders of War Contracts Investigating Employees

Pittsburgh

• • • **Holders of** certain war contracts here have been ordered by the U. S. Army to make a thorough investigation of their employees "from the president down" in order to forestall any future attempt at sabotage.

According to Capt. Richard P. Brown, intelligence officer, the investigations are to be complete to the point of checking on relatives in foreign countries, recent trips abroad, double checking of personnel records as to past employment and any other type of search which would tend to prove loyalty of the employee.

Weirton Wins Praise for Filling British Tinplate Order

• • • **The Weirton Steel Co.** and its employees were congratulated July 16 by the British raw materials mission for the "100 per cent performance in completing a one-year allocation of tinplate for the British Empire."

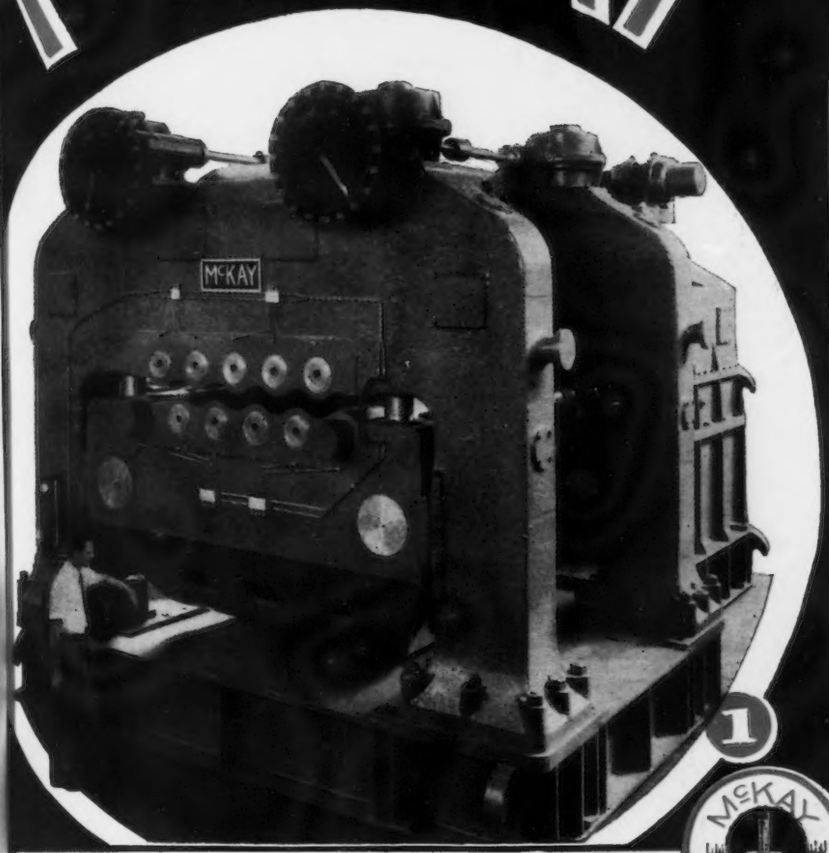
Ore Fleet's Loadings Are Up Sharply from 1941

Cleveland

• • • **With 40 per cent** of the 1942 shipping season elapsed to July 1, the Pittsburgh Steamship Co., U. S. Steel subsidiary, transported 500,000 gross tons more iron ore this year than in 1941 to July 1.

McKAY

1. The McKay Heavy Duty Roller Leveller.
2. The Budd-McKay Processing Machine.
3. McKay Heavy Duty Backed-Up 4-Hi Plate Leveller.
4. Backed-up Roller Leveller.



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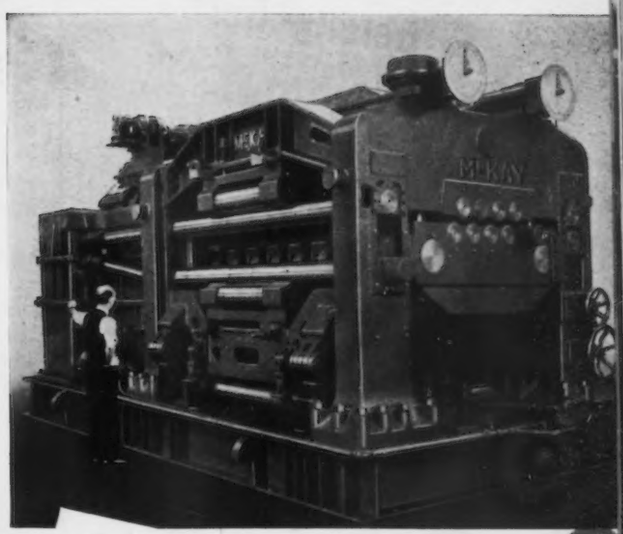

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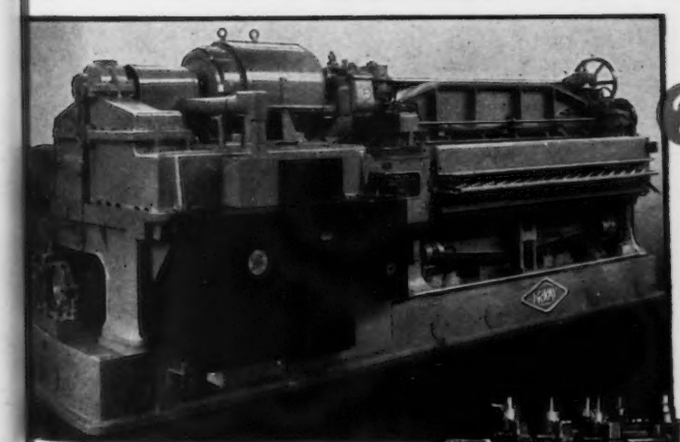
McKAY MEKROMETER ADJUSTMENT



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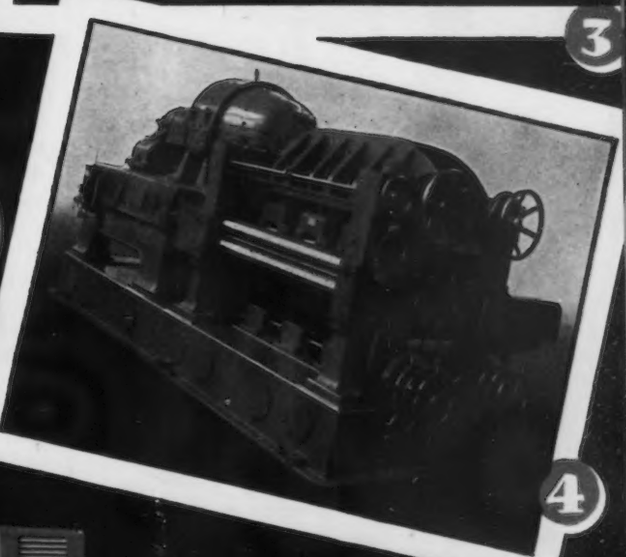

4

5. McKay Electric Tube Welder.

5

McKAY MACHINE *Company*

AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY

WEAN ENGINEERING CO., Inc. • WARREN, OHIO

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• In all our years of experience we have met with only one set of conditions where springs made of square wire were more suitable than round. If you want better performance at lower cost we'll be glad to prove to you—with all deference to sacred cows—that Holly's modern and correct design is the right answer to any spring problem. There's a Holly spring which exactly fits your needs.

Write, wire or better still . . . phone us.

AMERICAN SPRING & MFG. CORP. OF HOLLY
HOLLY, MICHIGAN

Small Bessemers May Ease Steel Casting Shortage, Help Foundries

By W. A. PHAIR

Chicago

• • • **The Bessemer converter** can be a means for quick relief of the serious shortage of steel castings, and currently idle gray iron foundries could be brought into the war production picture without imposing added loads on power lines or electric furnace builders. It would also avoid the imposition of further demands for electric furnace grades of scrap, which already are inadequate for current demands.

The side blow converter is no stranger to the steel casting shop, having been used in this country for years. These units are constructed so that the blast, instead of passing up through the metal bath, is introduced just above or at the surface of the molten iron. The converter is particularly suited to small jobbing work because of the high temperature of the metal, the cheapness of production and the small size of the normal heat.

It is obvious that the conversion of gray iron foundries to steel work cannot be accomplished without a good deal of effort. Many gray iron shops lack the proper crane facilities. All will require new training of personnel to grasp the technique of steel casting. But there is no question but that the utilization of such facilities would be far simpler and immeasurably quicker than the erection of entire new plants for producing steel castings by other methods. It would require the use of much technical ingenuity. But there is no shortage, they say, of that material in this country. Of course, cynics have pointed out that all too often the tale of American mechanical ingenuity is sung too loudly from the speaker's table and whispered too softly in the manufacturing plant, and in some instances the steel casting situation is often cited as an example of this paradox.

The war program has thrown such a load on steel foundries that only a part of the demands can be met. At the moment there is a serious deficiency of steel casting facilities for handling jobs from 10 to 40 tons.

Newspapers sing loudly of the American tanks with cast hulls, while actually very few of that type are being made thus far, and in fact, there is difficulty in obtaining sufficient cast turrets and fittings for welded and riveted tanks. The aircraft program is frequently interrupted because of difficulties in steel casting supplies and the same story is all too frequently repeated in gun and gun carriage manufacture, fittings for naval and merchant craft and a thousand and one other parts for the infinite paraphernalia of war.

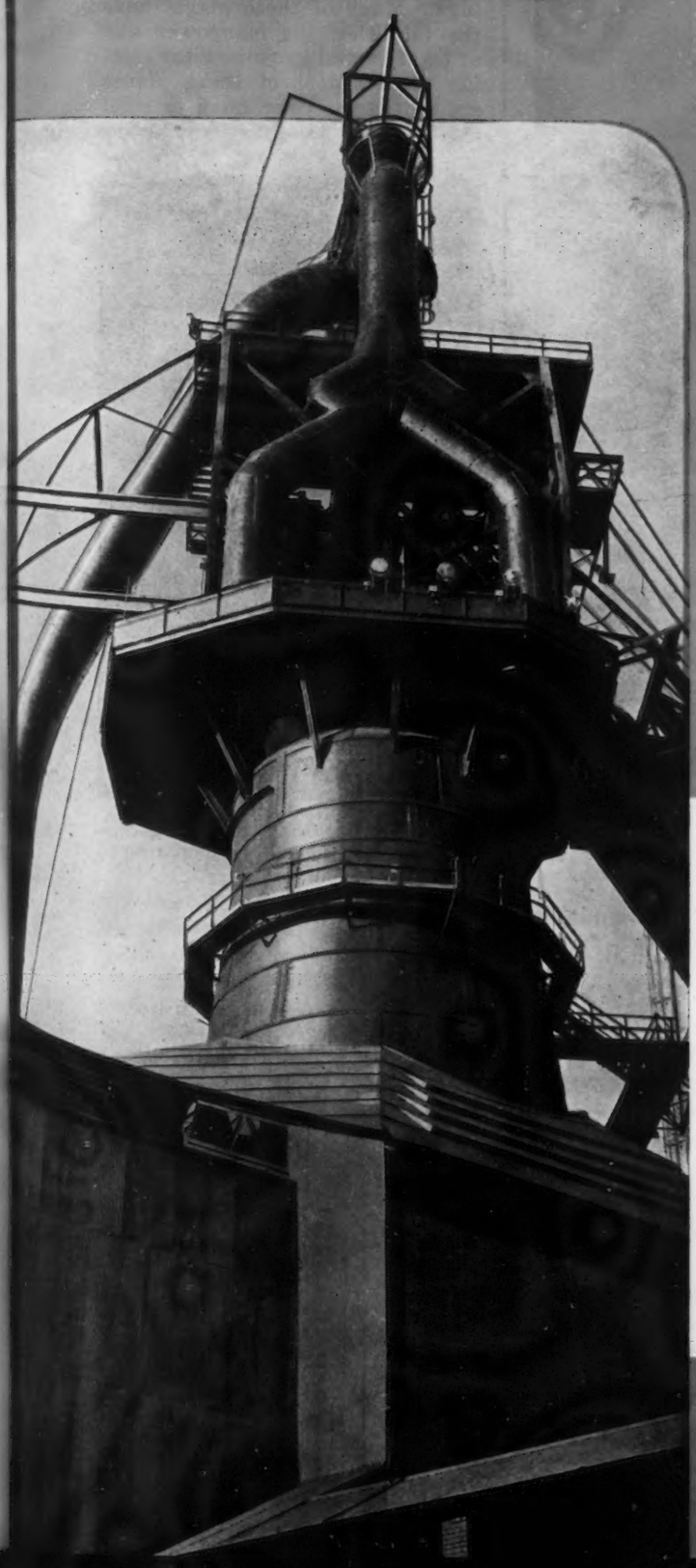
To meet the demands for castings, steel foundries have expanded as fast as possible, depending for the most part on additional electric furnaces because of the bias for electric steel, as shown by Army, Navy and Air Corps specifications. New open hearths have given only little relief because of the lengthy construction time, space and equipment required and the cost.

Falling back on electric furnaces for additional capacity throws a still heavier load on an overburdened furnace industry, an industry already far behind in deliveries. It also throws a heavier load on an already overloaded power system and requires incidental electrical equipment which today is practically unobtainable.

The importance of the savings in electric power possible by use of the converter is indicated by the fact that the production of a ton of castings by the converter process requires 1000 kw-hr. of electric energy less than would be demanded by an electric furnace to produce a similar quantity of castings.

Certain metallurgists state that all too little consideration is being given to the small sideblow converter principally because of prejudice based on ignorance and partly because of inertia. Steps* to eliminate some of this prejudice have already been taken and there recently have been some encouraging changes made in ordnance

McKee-Built Plants are BREAKING PRODUCTION RECORDS



JANUARY

Blast Furnace at ▬▬▬ broke all previous world's records for one month's pig iron production with

41,782 TONS

MARCH

Blast Furnace at ▬▬▬ set a new world's record with production of

43,478 TONS

MAY

Blast Furnace at ▬▬▬ produced

43,866 TONS

A NEW WORLD'S RECORD

DURING the past 6 months three blast furnaces, designed and built by Arthur G. McKee & Company (censorship prevents disclosure of names and locations) have *broken all previous world's records* for pig iron production.

These results are definite evidence of the performance obtained from advanced engineering and skilled construction combined with efficient operation.

We are proud of the part McKee has played in providing the facilities with which the Iron and Steel Industry is waging the battle of production.

Arthur G. McKee & Company

★ *Engineers and Contractors* ★

2300 CHESTER AVENUE • CLEVELAND, OHIO

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

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To good steel add expert

CRAFTSMANSHIP

With forgings, long life and satisfactory service depend upon this simple formula. Good steel plus expert craftsmanship are responsible for Standard's 147 years of success in steel product manufacture. Today, as in the past, the proven quality of forgings by Standard is being maintained.

The dependability built into every product delivered to Standard's customers is safeguarded by rigid control of every phase of production from acid open hearth to finished forging. Expert chemists and metallurgists carefully analyze all materials . . . trained personnel takes pride in strict adherence to customer specifications . . . and Standard's 119-acre plant offers the most modern shop facilities for producing better steel products.

If you require a dependable source of supply for steel forgings of high quality . . . try Standard.

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

STANDARD STEEL WORKS

DIVISION OF THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

specifications to permit use of converter castings.

Numerous gray iron foundries are now practically out of busi-

**See "Comparative Quality of Converter Cast Steel," by Sims and Dahle, presented at the 1942 annual meeting of the A.S.T.M. Short review in* THE IRON AGE, *July 9.*

ness or operating on skeleton schedules, because of the lack of war demand for gray iron castings. Many of these plants have the facilities, the manpower and at least partial know-how for casting steel. Most of these plants are suited for conversion to steel casting production, a changeover

One-ton Converter: This small side-blown unit is ideal for foundries.

that could be accomplished quickly and at comparatively low cost by the installation of converters.

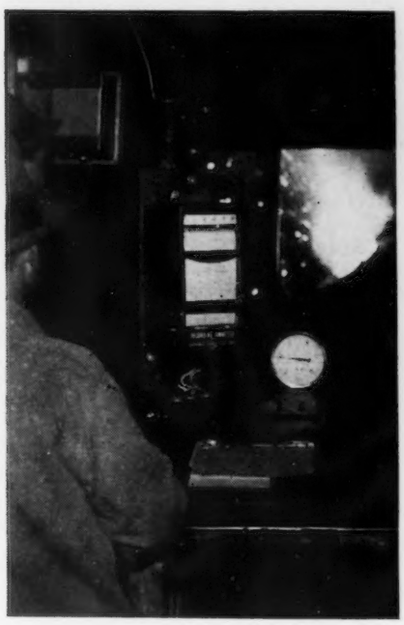
Scrap and pig could be melted down in the cupola as in ordinary gray iron foundry practice, the resulting iron being desulphurized in the ladle with soda ash, this desulphurizing** technique having been well established over the past few years. The desulphurized iron can then be blown in the converter and the resulting steel dephosphorized in the ladle by the method** developed by Yocum of Wheeling Steel Corp.

While existing specifications do not permit the use of converter steel castings as alternates for electric furnace castings, except

by special permission of the design agency, converter castings could find use in many subsidiary

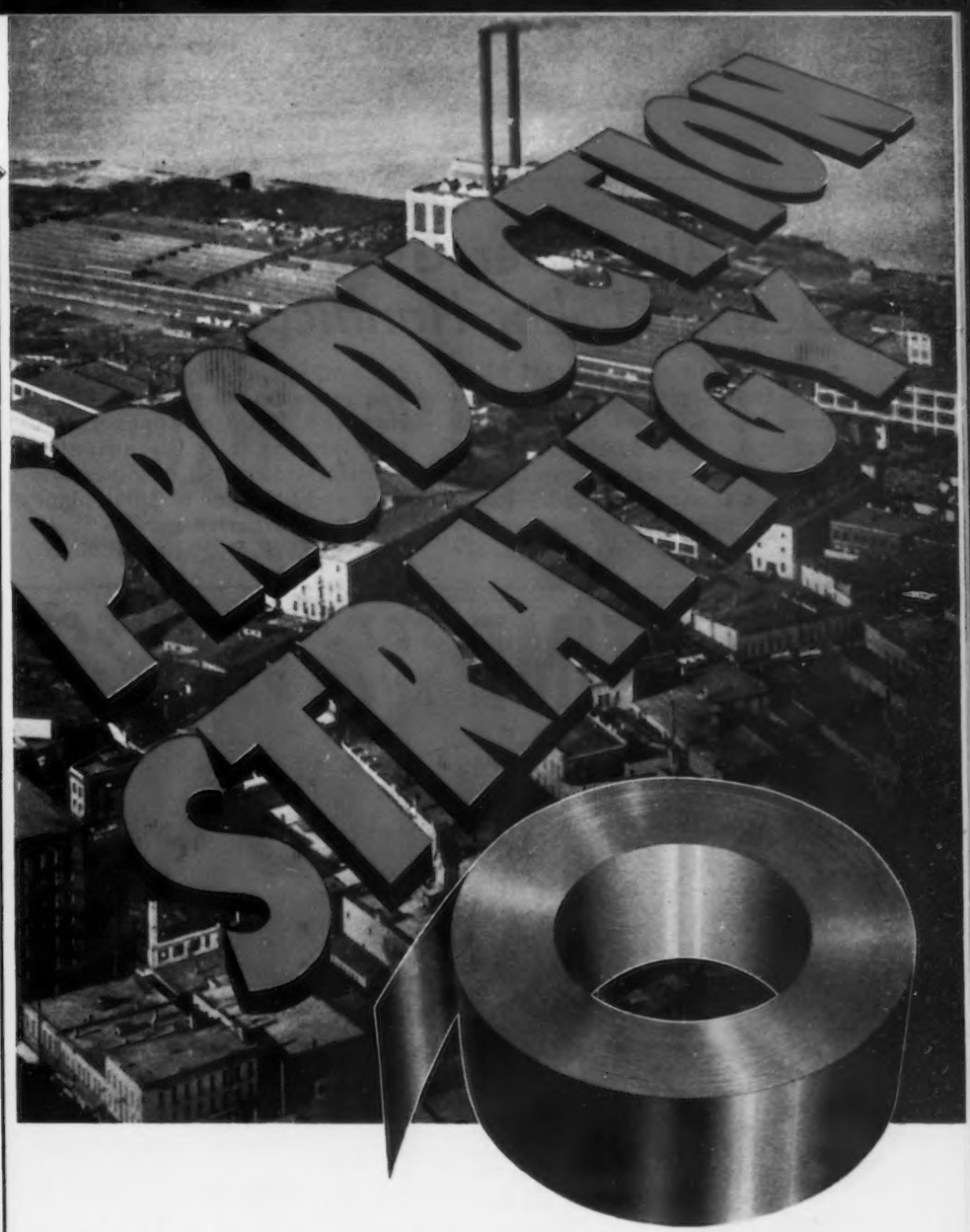
***See "Rapid Metallurgy in War Production," THE IRON AGE, April 23, 1942, p. 31. The Yocum process was described in THE IRON AGE, Oct. 31, 1940, p. 52. See also production of low carbon steel castings by using the Triplex method (cupola, converter and electric furnace) which was described in THE IRON AGE, May 7, 1942, p. 61.*

applications, freeing electric steel castings for armor and aircraft and gun fittings. The work done by Sims and Dahle of Battelle Memorial Institute, previously cited, would seem to justify further revision of specifications to permit wider use of converter steel castings.



Electric Eye: Converter blow can be accurately controlled by a Whiting electric eye unit shown in foreground.

In the better grades of electric steel castings, physical properties run around 70,000 lb. per sq. in. tensile; 32,000 lb. per sq. in. in yield; 20 per cent elongation in 2 in., and 25 per cent reduction in area. Converter steel has physical properties equal to steel made by other processes. It is being used successfully, made by special permission, to meet the requirements of specification QQS681-B-Class 4C. This calls for a tensile strength of 110,000 lb. per sq. in., a yield of 85,000 lb. per sq. in., 18 per cent elongation in 2 in. and a 40 per cent reduction of area.



MANY WAR FACTORIES BASE THEIR PRODUCTION STRATEGY ON THOMASTRIP DEPENDABILITY AND PERFORMANCE . . . . .

THE DEMAND for higher and still higher production places more rigid demands upon your cold rolled strip steel. Since Thomastrip is made with extreme care throughout every operating procedure, it will meet your increasingly strict requirements. Thomas steel is uniform in high quality and meets specifications accurately. Not only is Thomastrip available in the usual chemical and physical properties, but also in a wide variety of electro-coated as well as hot tin coated finishes. Let Thomas engineers help you to plan your war production strategy. Write or send samples today.

THE THOMAS STEEL CO. . . WARREN, OHIO

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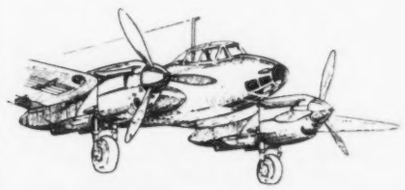
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Red Air Power Grows Despite Labor Handicap

• • • **It is now apparent** that when Nazi troops moved eastward toward Russia, there was a great deal about the Russian military machine that was underestimated by the German command. Probably the greatest of these underestimations was the Russian air force which, as far as was known, was made up of prototype ships. However, Russian designers like the Germans, had the advantage of determining military performance and behavior of their planes tried out in active service in the Spanish Civil War, and obviously derived great benefit from the experience. Moreover, they did not make the mistake of the Germans in "freezing" designs for production too soon, according to an account by John Hay Stevens in the June, 1942, issue of *Aircraft Engineering*, London.

Examination of Russian aircraft, information of which was largely from enemy sources, disclosed that the Soviet made successful compromises with some very difficult situations. These difficulties were, largely: The opposition of counter-revolutionary activities and a desperate lack of skilled labor. To meet these conditions, Soviet authorities first acquired many foreign licenses



RUSSIAN TANK BUSTER: Layout of the engine cowling with its several cooling inlets of the Russian Stormovik plane that has raised havoc with German tank forces. This ship is used primarily in low-flying attacks of ground forces.

which were used while a native school of design was developed. Rigorous watch was maintained, which kept political activities in check, and by adopting automatic machinery where possible the initial lack of skilled labor was overcome while operators were trained.

Another important point, connected with limited labor supplies, was the extensive use of mixed construction, that is, light alloy, wood, and steel tube, particularly in prototype ships. This division of work served to spread production over a larger field of labor than would normally be used.

A concentration on a few basic types of military planes was made, and prototypes were well tested before being put into production, accounting for planes first appearing in composite form and later being built in light alloy on modern lines. A definite "line" has been developed by Russian engineers. In one respect nearly all Soviet ships are similar and differ from designs of other countries, that being in the use of large wing root fillets. Aerodynamic design of these ships is sound, and for

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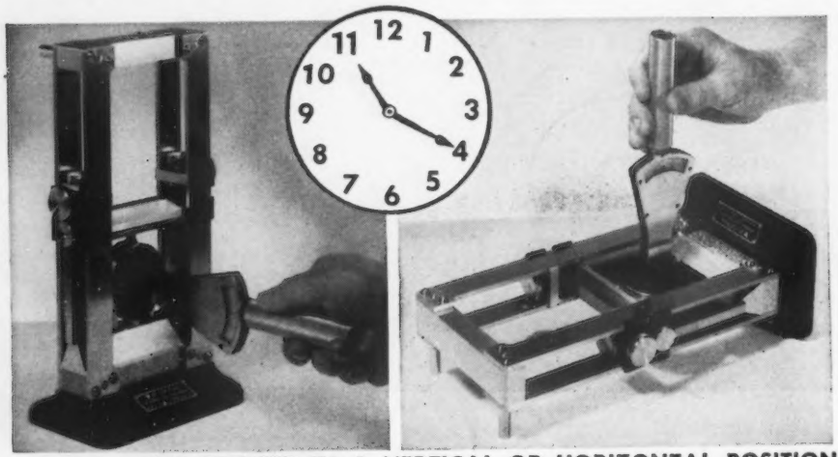

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QUICK, ACCURATE READINGS

This Internal Setting Gage (Patents applied for) was designed to eliminate the old fashioned time wasting method of setting instruments and gages by using clamps and parallels with gage blocks. Its gaging surfaces are processed and finished to millionths in flatness, thereby making possible the ultimate in checking with the minimum of adjustments. For example: if the gage is adjusted for 2" reading and 1.875" reading is desired it isn't necessary to make a readjustment; all that is required is to wring a .125 gage block on the bottom surface of the gage, immediately giving a 1.875" check.

The gage illustrated will cover readings up to 6" and models can be made to take care of any specific job within a reasonable range. Constructed of the finest steel, it is simply and quickly adjusted by two thumb screws on each riser. Its base is 4" x 6½" and overall height is 12".

During these critical times when every second counts, and manufacturers are seeking ways of increasing their production, this Eilstrom Internal Setting Gage (Patents applied for) has been an answer to at least one of their problems. Are you taking advantage of this new method? If not, make it a point to write us today for complete information and prices.

Originators of Chromium Plated Gage Blocks

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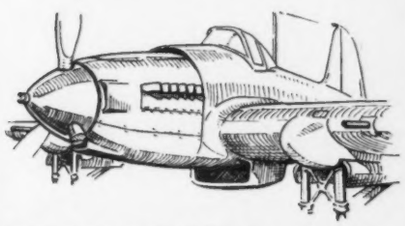
the most part they carry light armament.

One type that has especially been a headache to the German tank troops is the Russian IL-2 Stormovik, a single-seater, dive-bomber used in low-flying attacks on ground forces. The fuselage is of mixed construction, partly of light alloy with a wooden stressed-skin rear assembly, with the heavily armored cockpit over the wing. It has a 12 cylinder, liquid-cooled 1300 hp. V-type engine.

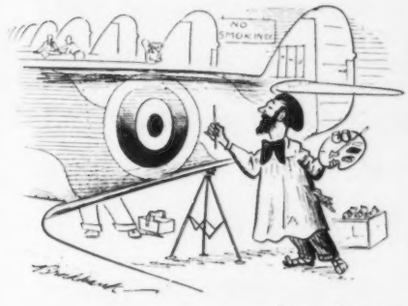
The armament consists of two machine guns and two cannon, according to the Germans, but there is reason to believe that this is an understatement.

The mainstay of the Soviet



NEW RED BOMBER: Layout of the forward part of the PE-2, the new Soviet high-speed bomber. This three-man ship is powered by liquid-cooled, V-type, 1300 hp. engines, and has a fully retractable landing gear.

bomber force in addition to the new Stormovik and the YAK-4 type ships consists of three basic types: The SB-2, DB-3, and the PE-2, to which may be added the SB-3 and the DB-3-f, variants of the first two types. The SB-2 is a three-seater, two-engined bomber as is the SB-3. The latter also having been adapted to dive-bombing. The DB-3 and DB-3-f are three or four seater, two-engine bombers, with the latter, being a newer type, holding the edge in speed and when fitted with extra tanks useful for long-range reconnaissance. The PE-2 is a new attractive, high-speed bomber, powered by two liquid-cooled V-type engines probably of 1300 hp.



—From Aeroplane

War Department Issues Plan for Five Projects

• • • **The War Department** announced July 16:

Authorization for the expansion of a depot in Seneca County, N. Y., to cost in excess of $5,000,000, to be supervised by the Syracuse district office of the Corps of Engineers.

Authorization for the expansion of a depot in Tooele County, Utah, to cost in excess of $5,000,000. Construction will be supervised by the Salt Lake City district office of the Corps of Engineers.

Authorization for the expansion of a depot in Pueblo County, Colo., to cost in excess of $5,000,000. Construction will be supervised by the Denver district office of the Corps of Engineers.

Authorization for the construction of an Air Force installation at Laurel, Miss., to cost in excess of $3,000,000. Lump-sum contracts have been awarded to Fromherz Associates, New Orleans, for architectural-engineering services; Lane Central Co., Memphis; Crawford Co., Baton Rouge; Boyd Construction Co., Columbia, Miss.; and Roy Keshaw, Montgomery, Ala. Construction will be supervised by the Atlanta district office of the Corps of Engineers.

Award of a negotiated contract to McGough Bros., Houston, for construction in connection with a Air Force training school at Marfa, Texas. Construction will be supervised by the Albuquerque district office of the Corps of Engineers.

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MONEL
STAINLESS
Harper's Fastenings are fighting the Axis and fighting corrosion. They are being used on a multiplicity of war equipment . . . such as ships, planes, guns and tanks . . . because they successfully defy rust, corrosion and other tough conditions. Practically speaking, they are "Everlasting."
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EVERLASTING FASTENINGS

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THROUGHOUT THE NIGHT DETERMINED

Like commandos on attack, stalwart steel men come in the dead of night to work till dawn, grim in their determination to produce speedily the fighting steels to arm your sons and brothers on the battle fronts. On the night-turn, thousands strong, come men like the metallurgist who added the final touch in perfecting a new armor steel; like the melter who now makes that steel two-hundred tons at a time.

There come men who roll wide steel plates for ships and miles of tubes for bombs and those who forge and machine glistening shells from steel made by their fellow workers. There are the coke workers, the blast furnace men, the melters, blowers, heaters, rollers, finishers —

FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

MEN MAKE BATTLE STEELS

workmen of many trades and skills—all doing their part to furnish steel for ships, tanks, guns, planes and other fighting equipment.

These men of steel, by their will-to-do to help win this war, achieve new high records in production night and day, month after month. Every ton of steel they make is shipped to war.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

PARTNER TO INDUSTRY IN WAR PRODUCTION

J&L STEEL

G. W's WEST POINT

Geo. Washington started a World War and learned his military art between his 21st and 26th years, as an officer in four small military expeditions into the Upper Ohio Valley. The task was to oust the French and clear the way for a project of settling English farmers on wilderness lands which he and his Virginia associates of the Ohio Company had obtained by grant from George II.

Washington's first expedition (1753) was to warn French against encroachment on English-claimed territory. He was but 21 when he crossed the Appalachians in dead of winter, with guide, interpreters and pack train. His mission was to uncover just how strong had become French occupation of rich Ohio Valley (present Pittsburgh district). He reported back that French officers "told me it was their absolute design to take possession of the Ohio."

Washington came out again in 1754 in command of small force of militia to chase out French. He got into a fight with them and their Indians. Ensign de Jumonville, young French marine officer of noble descent was killed. Later Washington found himself besieged in temporary stockade (Fort Necessity, in mountains near Uniontown, Pa.). He surrendered July 4. His little force was disarmed, but marched out with drums beating. They straggled back to Virginia, harassed by Indians and pretty well battered up. "The strife that armed all the civilized world began here" (in America) wrote Parkman, and Hugh Walpole said, "It was the volley fired by a young Virginian in the backwoods of America that set the whole world on fire."

These small skirmishes in "the woods and bushes" of the New World (French and Indian War) spread to war in the Old (Seven Years War, 1756-63) during which England wrested from France all of India, of Canada, of America (to the Mississippi) and compelled recognition of British sea supremacy. Washington's next military trips westward were with expeditions related to this early world conflict. He was "guest" aide with ill-starred Braddock (1755) who rejected the young Colonial officer's advice on how to fight Indians. As colonel of a regiment of bucktails (Colonials) he served under victorious General John Forbes (1758).

Washington's last trip to Pittsburgh was made in his 53rd year (1784) to promote a canal connecting the Potomac and Ohio — begun, but never completed. He also looked after his 50,000 acre holdings in Western Pennsylvania, valued at close to half million dollars. Over these now waved the Stars and Stripes of the young Republic his military genius had fathered, and of which he was shortly to be First President. Western Pennsylvania was young George Washington's West Point that fitted him for his career as a soldier and leader of a nation.

Been lacking time and manpower to organize your own priorities department?

The new Frasse Priorities Division will be glad to pinch-hit.

Manned by specialists, this new Frasse Division has only one job—to know priorities and the latest interpretation thereof. You are welcome to use it as if it were your own.

Incidentally, this latest Frasse Service has already developed a new wrinkle—a Master Check List containing a complete digest of the "dope" that must be shown on your steel orders. Incomplete priority data, you know, can hold up your order for days. A quick check against the Check List prevents any oversight. Care for a copy? Just mail the coupon below.

Meanwhile, file this memo in your source book of priority information. Next time you hit a puzzler on steel priorities, write or call: *Priorities Division, Peter A. Frasse and Co., Inc., 17 Grand St., N.Y.C. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia (Radcliff 7100 - Park 5541) • 50 Exchange St., Buffalo (Washington 2000) • Jersey City, Hartford, Rochester, Syracuse, Baltimore*

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ALLOY STEELS • DRILL ROD • WELDED STEEL TUBING
COLD ROLLED STRIP AND SHEETS • STAINLESS STEELS

PETER A. FRASSE AND CO., INC.
17 Grand St., New York City

Please send me, without obligation, a copy of your new Master Check List of Priority Requirements.

Name.....

Firm.....

Address.....

Recovery Corp. Will List Idle Steel

• • • **All idle and excess** steel inventories held by American industry are to be listed and made available to holders of high priority war contracts, according to Ernest A. Tupper, chief of the Inventory and Requisitioning Branch of WPB. The gigantic task of searching out and compiling inventories and directing them into war production will be undertaken by the Steel Recovery Corp., an agent of the Metals Reserve Corp., which in turn is an RFC subsidiary. The SRC, now in process of formation, will mail out its first questionnaires to holders of steel stocks early in August.

The first of the national steel inventories will cover stainless steel, and will be followed by structural, carbon, tool and alloy steels. The procedure followed will be similar to that used by Copper Recovery Corp., also an MRC corporation. The material, in some cases, may be purchased by the government agency.

The Steel Recovery unit will be the second government corporation formed to deal with specific material inventories, the Copper Recovery Corp. having issued its first inventory list last week.

The first step in SRC's program will be the sending of questionnaires to all steel using concerns. These questionnaires will probably require the listing of material on hand, item by item, with sizes, quantities and analyses.

Carnegie-Illinois to Close Tinplate Works

Pittsburgh

• • • **The Carnegie-Illinois** Steel Corp. announced it will close its Canonsburg tinplate works next month. Two thousand workers will be affected.

The hot mills first will be closed Aug. 7, with black pickling, annealing and cold-rolling departments shutting down as they process the final plate.

Stack at Gary Resumes

Chicago

• • • **The No. 2 blast furnace** at the Gary works of Carnegie-Illinois Steel Corp. went back into blast Saturday, after being shut down a short time for repairs.

ART FOR THE MASSES: Or scrap for Hitler? This is the yard of the Krasni Proletari metallurgical plant in Stalingrad, a city dominating one of the most important industrial areas in the U.S.S.R. Stalingrad is on the German schedule, and Panzerkampfwagen are pressing close.

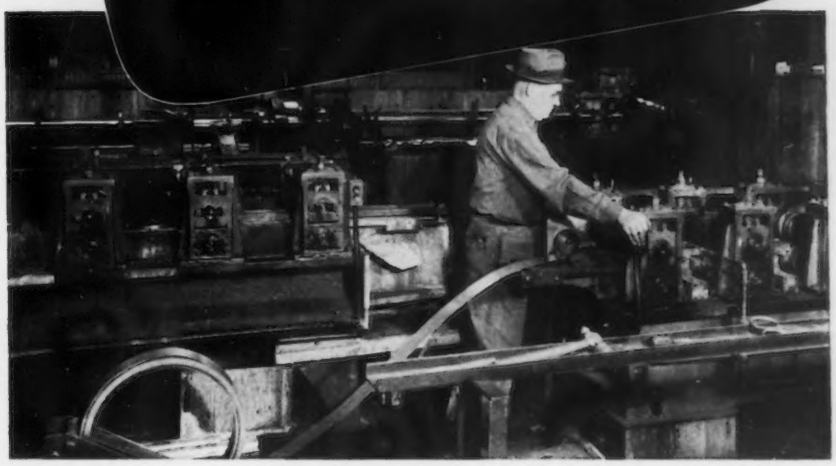
Auto Graveyards Produce 453,768 Tons During June

Washington

• • • **Automobile graveyards** throughout the country are breaking records in the amount of scrap metal which they are turning over for war production, the WPB Conservation Division announced July 16.

The statement was based on the complete June reports received by the automobile graveyard section of the division, showing that the yards produced 453,768 tons of scrap metal in that month. This is more than 300,000 tons above the monthly average for 1941.

it's another tough war job for ARMCO ZINCGRIP



Into this forming machine rolls a coil of ARMCO ZINCGRIP. And out comes the narrow strip of formed metal used for the interlocking cross sections of rolling steel doors.

Why doesn't the zinc peel or flake during this severe forming job? Because it is applied by a special manufacturing process. ARMCO ZINCGRIP is a *mill-coated metal*—ready for immediate drawing or forming. Its tightly adherent ZINCGRIP coating assures unbroken protection along corners and edges.

Rolling doors like these have many "victory" uses, ranging from vital war plants to fire doors on Uncle Sam's fighting warships. A zinc coating is needed to combat the corrosive effects of industrial atmosphere as well as salt-laden air on the sea. Does *your* war-work require the advantages of ARMCO ZINCGRIP? Just write The American Rolling Mill Company, 2561 Curtis Street, Middletown, Ohio.

MADE OF ARMCO INGOT IRON ZINCGRIP

TANKS—In the Sands They Will ture of the

HIDE THEM WHILE IDLE: The British learned to conceal their tanks in pits while maintenance goes on, far from a base. Enemy air and ground observers are less likely to spot the machines when they are dug in.

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CONCENTRATE FIREPOWER: Here are massed 25 pounders of a British armored division, with caissons and prime movers. The manner in which the anti-tank gun is used has had much bearing on the battle in the desert. Marshal Rommel uses self-propelled anti-tank guns, lightly armored, in conjunction with his tanks.

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MOVE THE TANKS SWIFTLY: The British also learned to make use of tank transporters, to speed tank movement and cut down on tank maintenance. After a battle, the transport is used to haul damaged tanks to repair depots. Here is a 26-ton British Matilda tank on on a transport near Tobruk.

Battle of the Decide the Fu- Near East

WHEELING INTO ACTION: The big pushes in the desert have undergone sharp tactical changes in recent weeks, but still the tank is the main factor, aided by airplanes and anti-tank guns. These are British 16-ton units, carrying a crew of three and armed with a Besa quick firing gun and a 2-pounder.

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KNOCKED OUT BY THE BRITISH: Enlisted men (with air-conditioned pants) examine two derelict German tanks and prepare to salvage parts and equipment. In the war on the desert, lack of spare parts may cause defeat. Note spare treads, heavy gun, and unusual hatches in turret.

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EN ROUTE TO THE FRONT: Tanks are shown being loaded aboard ship at an English quayside for transport to the Eastern battlefront. This is the Matilda, only a moderately good medium tank, as compared with the German PzKw-IV.

Union States Determination To Watch Living Costs

• • • **A resolution adopted** by the policy committee representing the local unions at all plants of the Bethlehem Steel Co., Republic Steel Corp., Youngstown Sheet & Tube Co. and Inland Steel Co., states:

"We are gratified at the decision of the War Labor Board in determining that the United Steelworkers of America both needs and deserves the establishment of union security and the check-off. This decision was based upon the finding that this union is one of the most democratic and most efficiently and economically administered. This is a worthy tribute to the steel workers of the nation who have put their heart and soul into the mighty United Steelworkers of America.

"We do not agree with the analysis of the majority members of the War Labor Board that its wage award will meet the living cost problem of the steel workers. This wage award of the board is based upon the President's 7-point national economic program, calling for national stabilization of cost of living. Wages cannot and must not be the sole object of the stabilization effort. The workers now look toward the President and Congress to carry through the remaining portions of the national economic program, such as an effective tax program and a real effective freezing of prices of goods, rents and other items of cost to the people.

"We shall watch this phase of the program most carefully. The workers are entitled to know whether their living costs are going to be stabilized, upon which principle the present award of the board in the 'Little Steel' case has been predicated."

Welding Society Issues Revised Welding Standards

• • • **The American Welding Society** has recently published two welding standards, entitled "Standard Methods for Mechanical Testing of Welds" and "Definitions of Welding Terms and Master Chart of Welding Processes." Both of these standards are revisions of earlier bulletins.

The first named bulletin describe in detail the principal mechanical tests applied to welds, including tests for density, soundness, tensile strength, shearing strength and ductility. The booklet includes sketches of the specimens and descriptions of the methods of testing and evaluating the results. In addition there is a section on procedures for etching.

In the second bulletin, 51 illustrations assist in making the various definitions clear. Both of these standards are available at 40c a single copy from the American Welding Society, 33 West 39th Street, New York.

CIO Steel Union Presses Demands on Entire Industry

Pittsburgh

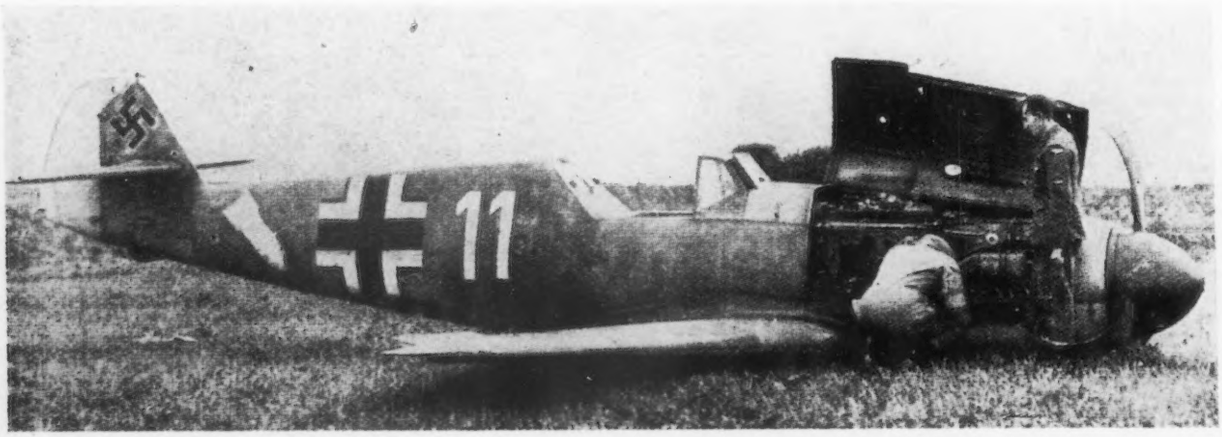
• • • **The policy committee** of the United Steel Workers of America met here July 21 as a preliminary move to the reopening of wage negotiations with U. S. Steel and the balance of the steel industry, exclusive of the "little steel" group. Letters were sent out notifying the steel firms of the desire of the union of renegotiate its contracts. The union hopes for a 44-cent-a-day wage increase, checkoff of union dues, and maintenance of union membership already granted to the union by the War Labor Board in the "little steel" case.

The Weirton Independent Union, holding an exclusive bargaining contract with Weirton Steel Co., has declared its intention to pursue demands for a general pay rate boost of $1.25 a day.

Division Moves to Baltimore

• • • **The entire** manufacturing plant of the X-ray division of the Westinghouse Electric & Mfg. Co. has been moved from Long Island City, N. Y., to Baltimore, Walter C. Evans, vice-president, announced. Administrative offices were transferred in January. Mr. Evans also announced the promotion of Edward F. Moran, sales manager, to the post of assistant to the manager, and the appointment of Chandler S. Eason, manager of the division's Philadelphia office to succeed Mr. Moran.

DOWN ON THE DOWNS: A Messerschmidt Me 109F shot down near the British south coast recently, being examined by members of the Royal Air Force. This is Germany's best single-seat fighter. Engine is liquid cooled and of 1200 hp. Armament is 20 mm. shell gun firing through the propeller and two 7.9 mm. guns in forward fuselage. Pilot's head and back are fully armor protected. This plane is frequently adapted to carry a bomb load up to 550 lb. Aeroplane photo.



Coke Shortage Threat Relieved As Coal Haulers Stop Strike

Pittsburgh

• • • **A threat** to pig iron production was averted here last week when 600 truck drivers who carted coking coal to more than 4000 beehive coke ovens in western Pennsylvania voted to return to work pending arbitration of their demand for a wage increase. They had been on strike six days.

Although pig iron production probably will not be affected as a result of the strike, several thousand tons of beehive coke production was lost because many coke plants had to seal their ovens and were unable to load or draw. These plants are starting up this week and coke supplies will probably be fairly tight for the next month or so among small merchant blast furnaces as well as steel companies utilizing beehive coke. The truck drivers had argued that their earnings on a tonnage basis were no more than 50c. an hr. and they were demanding 90c. an hr.

Chicago War Plants Asked For Data Covering Costs

Chicago

• • • **Plants having war contracts** with the Chicago Ordnance District have been asked by Brig. Gen. Donald Armstrong, district chief, to survey the cost of producing material under these contracts and to report these figures to the ordnance district.

Gen. Armstrong stressed that this review is being undertaken as much for the benefit and protection of the contractors as for the ordnance district. In a letter accompanying the questionnaire sent to the district's prime contractors, Armstrong said "Records and information which now can be assembled with relative ease, may become lost or forgotten later."

Plants with war contracts have in the past indicated that the three-year renegotiation clause, now a law, causes a feeling of considerable financial uncertainty. It is believed that the purpose of the survey now underway is to relieve a large share of this uncertainty by bringing to light now any cases where profits might be at questionable ranges. Voluntary renegotiation of such contracts now will likely tend to reduce such moves at a later date.

Gen. Armstrong pointed out that the survey is not an exercise by the Secretary of War of his statutory power of renegotiation.

Warehouses to Get Steel

• • • **Although steel warehouse** stocks have been run at approximately 500,000 tons a month, WPB will soon announce that allocations will be given to warehouses so they can get sufficient steel to meet less-than-carload lot demands. Order M-21-B has been amended to change the minimum rating from A-10 to A-1-A. This WPB action has the concurrence of the Army and Navy Munitions Board.

Indications are at present that the Army and Navy are discontinuing operating warehouses to a large degree, having discovered that it is more economical and efficient to make use of privately operated warehouses.

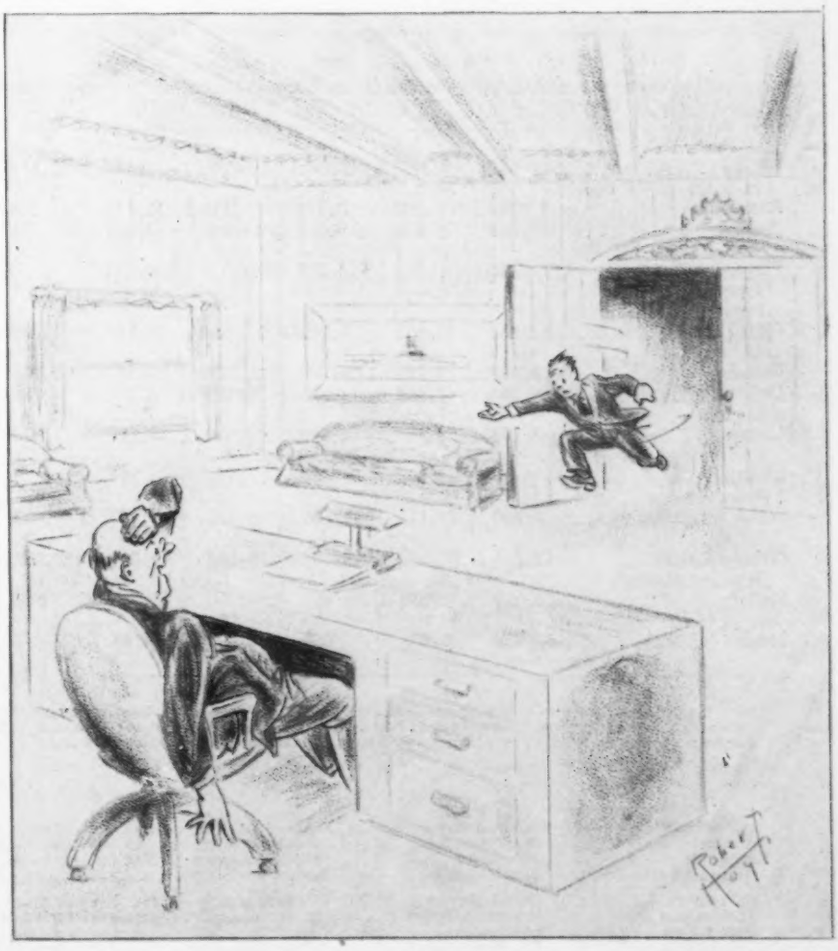
Inland Protests Pickets Coercing Employees

• • • **A protest against** coercion of non-union employees at its Indiana Harbor plants was registered with the National War Labor Board July 18 by Inland Steel Co.

Wilfred Sykes, president of Inland, telegraphed the board:

"Reference Inland Steel case. We respectfully advise that on Thursday night, July 16, a few hours after the announcement of your decision, large numbers of union pickets obstructed the gates of our Indiana Harbor plant and coerced employees into joining the union and paying union dues by physical violence and threats of physical violence, thereby violating the conditions of the order of this board with respect to union security which are expressed in second paragraph on page two of board's opinion on that issue dated July 16, 1942.

FROM A TO ZINC **BY ROBERT HOYT**



"You know that problem you gave to Research on N.E. steels, boss?—well, they've discovered another revolutionary way to make Rubber!"

Critical Tool Service Set Up

• • • **For several weeks the Critical** Tool Service Section of the War Production Board has been setting up a field force to investigate various metal-working plants throughout the country in order to survey the amount of idle machine tool hours available for war plants unable to secure new machine tools. At the end of this short period, some impressive results have been shown and this WPB agency has already brought to light that such hard-to-secure machines as boring mills, planers and turret lathes are available for sub-contracting work.

Another important contribution being made to American war production is that these reports of idle machine tool hours are being set up by districts and regions so that manufacturers by contacting their local WPB agency will be able to secure a sub-contractor in their own area, or in the next nearest area possible. This service is already set up in the Boston district, the New York district, Atlanta, Cleveland-Pittsburgh, and Philadelphia.

Despite the short period in which this service has existed, the Cleveland region through July 10 has placed 78,309 total hours of machine tool work to be performed over various periods of time, in addition to placing 6669 hours per week of machine tool work for an indefinite time. Among the plants that have been visited by the Critical Tool Service are included steel companies, manufacturers of household products, plants on war work, railroad maintenance shops

THE IRON AGE WEEKLY

IRON AGE Critical Tool Locating Service

Machines	Albany (1)	Boston (2)	Buffalo (3)	Brooklyn (4)	Bridgeport (5)	Chicago (6)	Cincinnati (7)	Cleveland (8)	Dayton (9)	Des Moines (10)	Erie (11)
Boring H. 3″ up, V. 45″ up	4,539	13,405	9,591	2,746	4,196	2,614	4,557	11,094	4,512	290	4,242
Broaching	710	7,202	2,379	216	1,815	343	981	4,060	2,622	152	2,622
Drilling Rad. 6 ft. up	2,249	10,518	6,820	1,240	3,591	565	961	2,093	1,622	0	1,616
Forgings Drop, 100 lb. up Press, 500 tons up	296	10,665	5,338	0	5,460	0	1,620	5,006	2,374	0	4,923
Gear Cutting 48″ up	952	13,528	1,995	604	1,187	1,052	1,475	6,708	1,512	0	5,504
Grinders	12,383	34,755	11,366	5,573	20,853	3,205	4,132	17,816	11,009	752	6,566
Lathes Engine	16,451	44,514	19,826	10,089	6,120	4,782	7,966	14,386	5,934	994	11,406
Lathes Turret, 2½″ bar up	3,240	13,306	11,943	3,638	4,287	1,916	5,372	8,646	1,717	920	3,481
Lathes Auto., 12″ up	0	3,003	284	702	113	0	216	0	1,344	0	0
Screw Machines ⅜″ up	4,460	21,111	10,195	9,757	5,442	6,459	2,344	26,220	9,822	168	6,815
Milling Reg. and planer	12,119	57,045	18,557	6,683	10,348	2,767	6,027	16,150	6,938	696	10,750
Planers 60″ x 15 ft.	1,053	896	907	96	84	168	120	358	237	0	450
Thread Miller	336	5,038	606	96	196	0	632	1,868	70	0	170

The figures above are based on a 168-hr. week and represent usable tool hours subject to operating labor available. Information used in presenting the totals is based on inspection of plants by WPB engineers and reports from plants with available equipment. The figures, compiled by THE IRON AGE from the latest information supplied by the War Production Board, are subject to change after publication. For tolerances and other details consult the WPB Contract Distribution Manager in the key cities where machine

Contract Distribution Offices.

(1) F. J. Holman, Standard Bldg., Albany, N. Y. Telephone 5-1749

(2) E. V. Hickey, 17 Court St., Boston, Mass. Tele. La. 7500

(3) Thomas J. O'Rourke, M & T Bank Bldg., Buffalo, N. Y. Tele. Mad. 3160

(4) Emile Z. Weinberg, 16 Court St., Brooklyn, N. Y. Tele. Mai 4-0306

(5) Raymond L. French, 144 Golden Hill St., Bridgeport, Conn. Tele. 4-9441

(6) Thomas N. Wynne, 20 North Wacker Dr., Chicago, Ill. Andover 3600

(7) Thomas Grace, Union Trust Bldg., Cincinnati, Ohio

(8) Henry F. Jordan, Union Commerce Bldg., Cleveland, Ohio Tele. Cherry 5975

(9) Collins Wright, Third Nat'l Bank Bldg., Dayton, Ohio Tele. Hemlock 6321

(10) George Beese, Crocker Bldg., Des Moines, Iowa Tele. 4-1909

(11) Harry B. Joyce, Erie Trust Co. Bldg., Erie, Pa. Tele. 24-123

(12) Ritchie Lawrie, Jr., 24 S. 4th St., Harrisburg, Pa. Tele. 41157

and eventually visits will be made to practically every metal-working unit in the United States. Moreover, it is planned to have field men visit these manufacturers at least once a month to bring up to date their idle machine tool hour status. As soon as these idle hours are engaged in subcontract work the proper adjustment is made in the WPB's tabulations, which will be revised weekly or semi-weekly.

In considering the possibility of utilizing some of these idle hours, holders of war contracts must appreciate that perhaps in some plants where idle hours are reported there is no operator available during those hours, or else the plant is actually not working at all during the hours in question.

Nevertheless, this does not necessarily mean that such idle hours could not be utilized, since it is likely that plants not operating 168 hr. a week would be inclined to do so if they had sufficient war work to keep them busy around the clock.

At the same time, the availability of additional large quantities of work would encourage the training of additional men to operate various machines during the idle intervals. Nevertheless, it must be appreciated that many of these machines are actually idle and have idle operators standing by due to unavailability of materials to perform work that may be lower rated or to a cancellation or delay in a war contract that had been pending.

See below for an IRON AGE *tabulation of critical machine tool hours available in 24 key industrial cities of the U. S. By using this* IRON AGE *tabulation, based on data from the WPB, you may be able to locate idle tools which may be useful in filling your war contract.*

IDLE MACHINE TOOL CHART

Compiled from War Production Board's Latest Data

Harrisburg (12)	Hartford (13)	Milwaukee (14)	Newark (15)	New York (16)	Peoria (17)	Philadelphia (18)	Pittsburgh (19)	Providence (20)	Rochester (21)	Syracuse (22)	Springfield (23)	Worcester (24)
361	2,635	294	11,902	6,512	554	6,717	6,284	1,325	.....	8,912	2,026	1,271
88	870	392	1,885	1,177	614	1,029	1,040	336	.....	2,830	579	1,827
0	1,140	58	3,397	2,696	128	2,527	3,034	644	.....	1,301	177	2,290
2,741	10,548	0	9,544	4,010	1,480	1,667	3,289	544	.....	14,081	2,785	7,121
0	654	0	1,232	2,658	0	2,391	1,453	231	.....	2,640	253	1,425
2,997	11,003	486	19,860	21,581	1,256	12,966	7,837	10,803	.....	17,801	2,909	7,559
1,147	7,424	1,241	24,569	25,143	1,760	24,406	19,820	6,209	.....	7,302	6,844	4,213
366	3,443	176	8,927	9,127	968	12,626	7,733	13,989	.....	7,470	1,206	3,216
0	1,284	840	2,444	306	0	148	0	0	.....	1,948	0	0
0	9,223	1,080	18,462	18,462	330	18,090	4,786	8,286	.....	15,114	3,846	6,162
2,526	11,829	378	20,575	13,710	2,560	12,554	7,282	2,626	.....	12,273	3,690	6,664
0	252	0	792	682	88	619	1,462	0	.....	324	173	120
0	1,341	72	889	1,151	0	1,165	614	276	.....	276	50	208

hours are available. Below are offices to which you may send your inquiries. In sending inquiries, state briefly the name of the company, description of parts, and equipment needed, since the Contract Manager will be able to supply you with additional information.

WPB Bureau of Field Operations

(13) Earl L. Milliken, Phoenix Bank Bldg., Hartford, Mass. Tele. 79251

(14) Lyman E. Wheeler, Plankinton Bldg., Milwaukee, Wis. Broadway 4440

(15) R. L. Kennedy, Globe Bldg., Newark, N. J. Tele. Market 20700

(16) W. O. Crabtree, Chanin Bldg., New York, N. Y. Tele. M. H. 3-6810

(17) Ralph W. Pritchard, Alliance Bldg., Peoria, Ill. Tele. 8623

(18) Orville H. Bullitt, Broad St. Sub. Sta. Bldg., Philadelphia, Pa. Tele. Locust 3400

(19) Charles E. Robinson, Fulton Bldg., Pittsburgh, Pa. Tele. Grant 2962

(20) Arthur J. Minor, Industrial Trust Bldg., Providence, R. I. Tele. 4684

(21) Mahlon Greg, Commerce Bldg., Rochester, N. Y. Tele. Stone 3007

(22) T. D. Harter, Starrett Syracuse Bldg., Syracuse, N. Y. Tele. 2-1343

(23) H. G. Philbrook, 95 State St., Springfield, Mass. Tele. 2-7493

(24) Dwight C. Daniels, State Mutual Bldg., Worcester, Mass. Tele. 6-4671

1941 Record Sheet Tonnage Reflects Consumer Buying Spree

• • • **Hot rolled sheet** production during 1941, totaling 9,567,618 tons, reached an all-time high and was the largest single tonnage item during the year, with pipe and tubes consuming 5,888,939 tons, and plates consuming 5,842,809 tons, affording a comparatively low second and third, according to reports of the American Iron and Steel Institute. The prominent position of sheets during the year was a result of the widespread surge in buying of consumer goods, from automobiles to electric toasters. With total finished steel consumption at the record breaking level of 62,484,162 tons, ingot production for the year totaled 82,839,259 tons and the industry operated at 97.3 per cent of capacity for the year.

By industries, jobbers, dealers and distributors were the largest single consumers of steel, requiring 9,199,811 tons or 14.72 per cent of the total steel shipped. This figure, however, is somewhat misleading since all steel pegged for these consumption points eventually was distributed throughout the other industrial consumer classification. Miscellaneous industries and exports were the next largest consumer, requiring 8,731,492 tons, or 13.97 per cent of all steel consumed. During 1940, exports alone amounted to 8,098,874 tons, indicating that during the past year less steel was exported in a semi-finished or finished state and the steel that would have gone into export was being finished into tanks, trucks, and other war implements in this country.

The marked rise in shipbuilding is indicated by the industry being the largest consumer of steel plates. Plates going into shipbuilding totaled 1,565,528 tons in 1941, while construction industries required 1,086,093 tons. In 1940, the construction industries were the largest consumers, with shipbuilding second. A rise in the consumption of tin and terne plate by the container industry is observed, with consumption during 1941 totaling 3,112,439 tons against 2,071,403 tons in 1940.

Classification of Billings of Products by Consuming Industries for 1941

Industries	Ingots, blooms, billets, slabs, tube rounds, and sheet and tin bars	Structural shapes and sheet piling	Plates (Universal and sheared)	Rails		Tie plates and track accessories including track spikes	Hot Rolled Bars			Cold finished bars (Carbon and alloy)	Pipe and tubes	Wire rods	Wire and wire products including fence posts
				Over 60 lbs.	All other		Carbon, including hoops and bands	Concrete reinforcing	Alloy				
1. Steel Converting and Processing Industries													
(a) Wire drawers and wire product mfrs.	51,863	.....	.....	.....	.....	.....	7,968	.....	7,037	896	15,757	436,066	250,233
(b) Bolt, nut, and rivet manufacturers	55,433	.....	1,451	.....	.....	.....	524,477	.....	19,052	89,684	.....	360,458	157,681
(c) Forging manufacturers	748,081	.....	8,154	.....	.....	.....	301,656	.....	197,002	11,651	.....	974	2,598
(d) All other steel plants and foundries	2,219,842	46,230	82,953	8,283	8,778	33,369	708,137	2,388	121,611	10,617	137,431	107,713	53,720
Total	3,075,219	46,230	92,558	8,283	8,778	33,369	1,542,238	2,388	344,702	112,848	153,188	905,211	464,232
2. Jobbers, Dealers and Distributors													
(a) Oil and natural gas industry	2,912	4,271	3,532	.....	.....	58	12,452	113	4,409	9,539	918,919	240	21,220
(b) All other	51,519	543,240	435,008	4,538	21,310	71,953	738,369	432,544	85,606	305,206	1,773,505	18,842	1,515,127
Total	54,431	547,511	438,540	4,538	21,310	72,011	750,821	432,657	90,015	314,745	2,692,424	19,082	1,536,347
3. Construction Industry													
(a) Public (Municipal, State, National)	7,776	185,543	47,313	2,762	231	4,218	16,916	143,871	1,564	967	37,014	452	25,905
(b) Highways	284	150,628	54,406	308	.....	.....	27,859	220,635	357	131	5,232	5,698	35,552
(c) Railways	19	39,401	17,730	56	.....	7,712	7,648	10,707	60	15	3,259	152	1,205
(d) Automotive and aircraft	40	228,177	51,453	1,734	336	46	19,990	61,403	693	336	6,179	.....	6,300
(e) Utilities	282	105,721	69,975	8,150	6,042	2,531	48,918	57,389	205	302	143,097	9,030	18,988
(f) Bldg. trim, accessories and builders' hdwe.	2,881	35,315	45,590	.....	.....	.....	131,230	2,125	4,201	1,907	64,676	8,061	68,380
(g) All other	24,367	1,930,298	799,626	72,516	13,790	20,322	253,308	702,311	4,182	2,317	284,197	11,139	207,852
Total	35,649	2,675,083	1,086,093	85,526	20,399	34,831	505,865	1,198,441	11,262	5,975	543,654	34,532	364,182
4. Shipbuilding Industry	32,344	442,066	1,565,528	1,937	374	353	190,154	2,113	19,038	15,687	97,848	1,406	15,253
5. Pressing, Forming and Stamping Industry													
(a) Metal furniture and office equipment	2,433	1,883	3,354	.....	.....	.....	24,865	.....	1,170	20,175	18,795	15,640	90,181
(b) Hardware and household equipment	5,248	1,741	6,645	.....	.....	.....	37,686	.....	5,529	33,039	13,088	1,127	185,986
(c) All other	18,244	15,897	160,923	.....	.....	.....	307,579	.....	126,773	32,175	63,392	59,144	316,512
Total	25,925	19,526	170,922	.....	.....	.....	370,130	.....	133,472	85,389	95,275	75,911	592,679
6. Container Industry													
(a) Oil and natural gas industry	.....	1,972	7,636	.....	.....	.....	3,496	.....	.....	248	468	.....	861
(b) All other	1,957	304	7,896	.....	.....	.....	35,261	.....	399	690	389	100	90,589
Total	1,957	2,276	15,532	.....	.....	.....	38,757	.....	399	938	857	100	91,450
7. Agricultural, Incl. Impl. & Equip. Mfrs.	79,653	50,306	52,490	.....	.....	.....	424,953	.....	33,658	61,742	24,805	5,388	65,777
8. Machinery and Tools													
(a) Machinery and tools, not incl. elect. equip.	73,311	169,525	345,864	2,211	4,089	131	253,716	.....	78,257	151,619	70,562	7,157	58,517
(b) Electrical machinery and equipment	22,713	27,774	104,871	.....	44	.....	93,777	.....	20,509	45,819	157,055	55,690	44,023
Total	96,024	197,299	450,735	2,211	4,133	131	347,493	.....	98,766	197,438	227,617	62,847	102,540
9. Automotive and Aircraft Industry	274,223	23,461	116,433	.....	.....	.....	761,300	.....	697,689	306,557	82,923	51,246	69,170
10. Railroad Industry													
(a) All railroads	64,096	152,356	416,774	1,424,886	21,888	695,741	220,514	.....	22,600	2,940	54,322	194	28,355
(b) Car and loco. builders and parts mfrs.	66,748	428,204	683,451	37,101	2,952	17,465	273,120	.....	19,253	4,405	19,856	523	13,429
Total	130,844	580,560	1,100,225	1,461,987	24,840	713,206	493,634	.....	41,853	7,345	74,178	717	41,784
11. Oil, Natural Gas and Mining Industry													
(a) Oil and natural gas, incl. pipe lines	10,061	57,334	130,073	122	94	144	49,063	1,169	19,412	4,345	1,355,415	1,635	5,045
(b) Mining, quarrying and lumbering	1,048	25,615	24,807	9,279	60,862	19,370	38,356	6,501	3,267	1,377	13,665	31	6,918
Total	11,109	82,949	154,880	9,401	60,956	19,514	87,419	7,670	22,679	5,722	1,369,080	1,666	11,963
12. Miscellaneous Industries and Export	2,277,859	293,555	646,901	131,681	44,923	37,272	643,333	203,261	271,740	287,809	571,460	255,022	488,948
13. Total (Items 1 to 12)	6,095,237	4,960,822	5,890,837	1,705,564	185,713	910,687	6,156,097	1,846,530	1,765,273	1,402,195	5,933,309	1,413,128	3,844,325
14. Less shipments to members of the Industry for conversion or resale	1,718,524	19,004	48,028	2,094	6,207	17,340	367,276	1,081	92,738	1,021	44,370	187,681	49,787
15. Net Total	4,376,713	4,941,818	5,842,809	1,703,470	179,506	893,347	5,788,821	1,845,449	1,672,535	1,401,174	5,888,939	1,225,447	3,794,538

Interesting also is the increase in the consumption of wheels and axles as well as in total rail consumption, showing the marked rise in railroad building. For the most part, this material was not used in new rail line construction, but mostly in the replacement repair of roads and the reservicing of idle equipment. This important steel outlet has been hard pressed during the past year in providing adequate facilities to serve the various war industries throughout the country, and great numbers of idle cars have been repaired and pressed into service to augment the existing material distributing system.

Steel going into the production of various of the major steel items during 1940 and 1941 are shown in the tabulation to the right. The steel products shown, representing about two-thirds of the total consumption, are compared with 1940 figures. It may be observed that there is little variance in the per cent of all steel required by these products from 1940 to 1941, even though total steel production increased during 1941 16,633,337 tons.

Steel Required During 1941 in Major Products

	1941		1940	
	Consumption Net Tons	Per Cent of All Steel Consumed	Consumption Net Tons	Per Cent of All Steel Consumed
Semi-finished steel (ingots, blooms, billets, slabs, tube rounds, and sheet and tin bars)	4,376,713	7.00	4,233,407	9.23
Plates (universal and sheared)	5,842,809	9.35	4,065,383	8.87
Bars (hot rolled and cold finished, carbon and alloy)	10,707,979	17.14	7,492,365	16.34
Tin, terne, and black plate	4,246,528	6.80	3,047,183	6.65
Sheet and strip (hot and cold rolled, galvanized, and all other)	16,165,191	25.87	12,553,427	27.39
Tool steel bars	166,050	0.27	53,633	0.12
Total steel consumed, net tons	62,484,162		45,850,825	

As Reported by Companies Producing More Than 97 per cent of the Year's Output (Net Tons)

Black plate	Tin and terne plate (Hot rolled and cold reduced)	Sheets and Strip: Hot rolled	Sheets and Strip: Cold reduced	Sheets and Strip: Galvanized	Sheets and Strip: All other	Tool steel bars	Wheels and axles	Forgings	Steel castings	Skelp	All other steel products	Total steel products	Iron and brass products	Grand total	Less shipments to members of the industry for conversion	Net total	Pig iron, ferro-manganese, etc.	Industries
.....	.....	.....	.....	.....	.....	995	.....	.....	.....	.....	767	771,582	2,052	773,634	237,893	535,741	2,070	1.
.....	.....	23,799	6,245	29	70	1,865	.....	.....	.....	.....	2,905	1,243,149	3,058	1,246,207	85,440	1,160,767	6,045	(a)
.....	.....	.....	.....	.....	.....	1,932	195	18,468	1,348	.....	1,561	1,293,620	4,355	1,297,975	153,533	1,144,442	29,071	(b)
1,568	995	668,525	39,985	7,147	5,703	6,134	477	26,744	39,486	825,651	10,197	5,173,684	164,899	5,338,583	3,381,730	1,956,853	6,461,371	(c)
																		(d)
1,568	995	692,324	46,230	7,176	5,773	10,926	672	45,212	40,834	825,651	15,430	8,482,035	174,364	8,656,399	3,858,596	4,797,803	6,498,557	TOTAL
1,408	54	28,075	1,254	3,243	222	86	.....	4,393	59	.....	1,132	1,017,591	780	1,018,371	xxxxx	1,018,371	686	2.
69,556	64,912	806,565	398,533	673,592	67,433	37,878	1,484	5,624	1,219	.....	25,300	8,148,863	32,577	8,181,440	xxxxx	8,181,440	153,014	(a)
																		(b)
70,964	64,966	834,640	399,787	676,835	67,655	37,964	1,484	10,017	1,278	.....	26,432	9,166,454	33,357	9,199,811	xxxxx	9,199,811	153,700	TOTAL
.....	22	12,856	2,259	9,494	34	925	.....	12	.....	.....	15,728	515,862	2,693	518,555	xxxxx	518,555	538	3.
147	151	42,891	973	131,543	132	18	.....	250	304	.....	4,009	681,504	27,109	708,613	xxxxx	708,613	1,179	(a)
.....	.....	8,028	580	4,484	350	30	.....	.....	.....	.....	107	101,543	951	102,494	xxxxx	102,494	838	(b)
413	26	17,549	1,660	4,893	537	125	.....	2,012	.....	.....	1,157	405,061	1,401	406,463	xxxxx	406,463	.....	(c)
6,300	393	23,279	7,932	441	23	191	6,988	581	19	.....	1,163	511,640	3,363	515,003	xxxxx	515,003	753	(d)
18,988	12,091	386,779	103,107	138,666	4,007	197	.....	143	258	.....	2,951	1,015,370	4,739	1,020,109	xxxxx	1,020,109	168,974	(e)
58,380	1,602	325,000	41,992	103,145	2,903	103	2,047	1,635	1,908	.....	13,956	4,821,357	35,295	4,856,652	xxxxx	4,856,652	34,164	(f)
07,852																		(g)
4,206	14,285	816,382	158,503	392,666	7,986	1,589	9,035	4,633	2,489	.....	39,071	8,052,337	75,551	8,127,889	xxxxx	8,127,889	206,446	TOTAL
25	247	95,287	9,998	35,015	4,316	1,556	1,152	172,851	12,485	.....	5,317	2,722,350	11,063	2,733,413	xxxxx	2,733,413	9,380	4.
1,249	2,536	251,133	193,660	12,469	6,180	277	.....	65	45	.....	30,829	676,944	.....	676,944	xxxxx	676,944	605	5.
88,846	32,029	628,961	536,783	86,208	75,124	910	.....	.....	42	.....	6,125	1,745,117	1,693	1,746,810	xxxxx	1,746,810	42,504	(a)
50,394	51,219	1,780,302	761,881	48,690	83,540	1,600	1,100	394	4,257	.....	13,420	3,897,436	346	3,897,782	xxxxx	3,897,782	24,821	(b)
																		(c)
140,489	85,784	2,660,396	1,492,324	147,367	164,844	2,787	1,100	459	4,344	.....	50,374	6,319,497	2,039	6,321,536	xxxxx	6,321,536	67,930	TOTAL
16,648	185,036	166,717	17,840	7,460	129	.....	.....	.....	15	.....	28,430	436,956	411	437,367	xxxxx	437,367	.....	6.
179,051	2,927,403	680,748	81,698	36,723	3,317	380	.....	.....	35	.....	5,087	4,052,027	16	4,052,043	xxxxx	4,052,043	.....	(a)
																		(b)
195,699	3,112,439	847,465	99,538	44,183	3,446	380	.....	.....	50	.....	33,517	4,488,983	427	4,489,410	xxxxx	4,489,410	.....	TOTAL
150	186	233,113	17,763	77,430	5,133	597	.....	3,156	27	.....	17,300	1,153,626	52	1,153,678	xxxxx	1,153,678	141,513	7.
562	4,815	133,572	45,466	3,552	7,725	55,826	6,387	44,057	36,666	.....	8,488	1,562,075	7,637	1,569,712	xxxxx	1,569,712	150,311	8.
2,403	939	389,179	133,018	20,471	155,527	2,714	2,133	10,304	2,256	.....	9,531	1,300,750	525	1,301,275	xxxxx	1,301,275	16,915	(a)
																		(b)
2,965	5,754	522,751	178,484	24,023	163,252	58,540	8,520	54,361	38,922	.....	18,019	2,862,825	8,162	2,870,987	xxxxx	2,870,987	167,226	TOTAL
409	2,234	1,986,692	1,553,958	16,584	98,379	22,189	272	19,360	72,105	.....	15,024	6,170,208	221,995	6,392,202	xxxxx	6,392,202	825,437	9.
.....	1,798	113,255	11,154	24,088	6,399	1,568	180,133	6,552	10,283	.....	49,238	3,509,134	24,732	3,533,866	xxxxx	3,533,866	4,800	10.
239	1,723	249,629	8,509	67,078	1,624	965	213,369	3,652	11,094	.....	5,719	2,130,108	16,827	2,146,935	xxxxx	2,146,935	140,472	(a)
																		(b)
239	3,521	362,884	19,663	91,166	8,023	2,533	393,502	10,204	21,377	.....	54,957	5,639,242	41,559	5,680,801	xxxxx	5,680,801	145,272	TOTAL
904	6,217	76,400	2,467	2,901	123	480	.....	1,248	695	.....	6,976	1,732,323	3,660	1,735,983	xxxxx	1,735,983	620	11.
537	141	13,017	828	3,273	74	2,287	3,439	1,816	1,501	.....	10,569	248,578	579	249,157	xxxxx	249,157	5,879	(a)
																		(b)
1,441	6,358	89,417	3,295	6,174	197	2,767	3,439	3,064	2,196	.....	17,545	1,980,901	4,239	1,985,140	xxxxx	1,985,140	6,499	TOTAL
64,223	471,437	894,183	361,916	196,105	41,318	27,641	14,242	228,805	11,014	153,584	70,902	8,689,134	42,358	8,731,492	xxxxx	8,731,492	694,313	12.
482,378	3,768,206	10,035,534	4,341,459	1,714,724	570,322	169,469	433,418	552,121	207,121	979,235	363,888	65,727,592	615,166	66,342,758	3,858,596	62,484,162	8,916,273	13.
1,591	2,465	467,916	21,962	6,674	296	3,419	227	14,588	906	677,120	1,656	3,753,971	104,625	3,858,596	xxxxx	xxxxx	xxxxx	14.
480,787	3,765,741	9,567,618	4,319,497	1,708,050	570,026	166,050	433,191	537,533	206,215	302,115	362,232	61,973,621	510,541	62,484,162	xxxxx	62,484,162	xxxxx	15.

Last Half of '42 Seen As Most Difficult for Mills

Pittsburgh

• • • **Already facing** the spectre of a definite scrap shortage this fall and winter, steel companies now see a need for a greater number of necessary repairs on blast furnaces and open hearth units in the last six months of the year compared with the first half. Some production has also been lost due to summer heat and this factor is expected to exert its influence in the coming two months.

According to some steel operators, the utmost in ingenuity will be necessary to approach the steel ingot output registered in the first 6 months. The blowing out of blast furnaces for relining or other repairs places an extra burden upon scrap dealers and brokers who must make up for the loss in pig iron. Furthermore, the loss of home scrap due to lend-lease shipments is greater than many scrap and steel officials had believed, owing to the huge amounts of raw steel exports.

Nelson Issues Warning on Cargo Plane Complications

Washington

• • • **After making** an "intensive study of the enormously complicated problem of the cargo plane," Donald M. Nelson advised on Tuesday against undue optimism about the possibilities of immediate construction of cargo planes of any new type. Mr. Nelson said that men, machines, facilities and materials could not be made readily available for any new cargo plane program beyond the program now under way except at the expense of other parts of the war effort. The present cargo plane program is already of considerable proportions and increasing rapidly. The "Mars" type ship as well as smaller cargo ships are receiving consideration.

They Said Last Week

• • • **"Perhaps the most critical shortage which affects the synthetic rubber program is air compressors. . . . Present makers of compressors are booked up for the entire production through March, 1943, and yet not all of the orders for the present synthetic rubber program are placed."—Donald M. Nelson, WPB chairman, before Senate sub-committee, July 14.**

• • • **"American industry, by applying a fraction of the imagination and vigor it has shown in tooling up for war, can convert its resources just as effectively to the much greater task of replacing war's destruction. We have given America the highest standard of living in the world. Tomorrow's task will be to extend these benefits to every continent."—Duncan W. Fraser, president, American Locomotive Co., before Chicago Heights Manufacturers' Association.**

• • • **"Before the war ends, the living standards of the American people will be reduced below the level prevailing at the bottom of the great depression."—Richard Gilbert, of OPA, at Los Angeles, July 13.**

• • • **"It (the fight in Congress over OPA funds) means that I get my throat cut for talking plainly. I would rather have it cut than to have people asking me later what the hell I was doing when I was supposed to be keeping prices down."—Leon Henderson, OPA administrator, in Washington, July 15.**

• • • **"Congress is much less of a luxury than any other department or agency of government."—Senator O'Mahoney, in Washington, July 13.**

• • • **"The Russians always will be able to rescue the main force of their troops and bring up reserves. Complete encirclement and annihilation are impossible."—Schwarze Korps, organ of the Nazi Elite Guard.**

• • • **"At this juncture in the war, it would be most unfortunate for Congress to create the impression that we are more interested in patronage than anything else."—Senator Barkley, in Washington, July 13.**

• • • **"On the average, the output per person working for the British Ministry of Supply throughout the whole range of engineering and allied industries is at least one-third greater than the output per person at the beginning of 1941."—Sir Andrew Rae Duncan, in London, July 15.**

Curtailed Finishing Mills May Have Lost Skilled Men

Pittsburgh

• • • **When and if** certain finishing mill operations are restored to higher levels after having operated intermittently or not at all because of priorities, steel companes may find their skilled workmen from these departments have gone to other war jobs. The new directive plan of WPB accentuates this man power condition.

In recent months, many finishing mill operations have had to be curtailed due to higher priorities syphoning off steel for such items as export, plates, shell steel, etc. In some cases, notably certain wide strip mills where the entire output is being concentrated on plates, the steel companies have lost or are losing highly trained workmen from the cold reduction mill departments. It is believed also that some of the hot strip mill employees working at operations not necessary in the production of plates may seek work elsewhere, although a large number are being absorbed as rapidly as possible into other steel work groups.

This migration of skilled workers does not represent a net loss to the overall war program, but at the same time may place serious difficulties in the way of steel companies in case the distribution of steel products should take such a turn that units not now working or working only part time might be restored to full production, as may be the case because of the new directive program.

Allegheny Ludlum Profits Are $1,205,565 in Second Quarter

• • • **Allegheny Ludlum Steel Corp.** reported consolidated net profit of $1,205,565 for the second quarter of 1942, after tax deductions. These earnings are equivalent to 92c. per share on outstanding common stock.

For the first half of 1942, consolidated net profit was $2,536,991, equivalent to $1.94 per share of common stock.

•

Sharon Steel Reports

• • • **Sharon Steel Corp.** reported net profit of $386,899 for second quarter, against $250,302 in first quarter.

Questions and Answers on PRP

(Following are some questions that have come into the War Production Board Regional Office at Philadelphia concerning the Production Requirements Plan and how it applies to individual manufacturers. The WPB Regional office furnished the official answers to these questions so that readers of THE IRON AGE may be guided by them.)

• What do I do if I am not sure whether I will require over $5,000 of metals on the metals list, that is, I used $4,000 last quarter and it may be over $5,000 this quarter?

If you contemplate using over $5000 in the coming quarter, you should file application PD-25-a. This application is for requirements in the coming quarter, therefore if not filed by July 1 it would probably be judged in default.

• How can I estimate my requirements of raw materials, when I produce only after receiving contracts and do not maintain an inventory of materials because the contracts always require different materials?

If yours is the type of business where you cannot estimate requirements of raw materials, then you will have to rely on the "as required" procedure of filing PD-25-f for interim requests to take care of these special requirements.

• At the present time, I have sufficient materials (less than $5,000) to fill all orders on hand. I do not need any materials now, but expect several large contracts momentarily which will probably put me over the $5,000 mark.

Whether or not you have enough materials on hand to fill all contracts, if you contemplate using $5000 worth of metals in the next quarter, it is mandatory that you file PD-25-a. Amendment No. 2 to priorities regulation No. II provides the interim procedure. In substance it says that any class one producer who is not in default in filing his PRP application for the third quarter, but has not received his PRP certificate may apply or extend any preference rating orders or certificates that he has on hand up to an aggregate quantity not greater than 40 per cent of each such material which he has indicated as his anticipated requirements on his PRP application for that quarter.

• Suppose I get an additional contract and need more material, what do I do?

You file an interim request, using form PD-25-f for the additional materials needed.

• I need an A-1-k or higher in order to obtain this material, but my rating is only A-3. What can I do?

You file an interim request on PD-25-f asking for the higher rating to get the materials.

• We are not operating under PD-25-a and would like to know if under priorities regulation No. 3 as amended June 10, 1942, we can extend a rating for tool steel to be used in processing a defense contract for which we have already extended same rating.

If you are in the category of manufacturers utilizing more than $5000 worth of metals in a quarter and did not file PD-25-a on July 1, you are in default and may not extend any ratings without getting permission from the PRP section in Washington.

• We do not use $5,000 worth of metals in any quarter, and do a great deal of sub-contract work in defense work with metals furnished to us. Do we have to file form PD-25-a?

If you do not purchase $5000 worth of metals in any quarter, it is not mandatory that you file form PD-25-a. However, you should remember that metals used as operating supplies must be included in this $5000 limitation.

• We understand form PD-25-g is out as of July 1. What happens to orders already placed for delivery in third quarter of 1942 and first quarter of 1943 on "as required" basis filed on PD-25-g?

Yes, PD-25-g is out as of July 1, that is, its applicability. However, you may receive materials in the third quarter for which you have extended preference ratings, provided however they are not in excess of the 40 per cent limitation covered in amendment No. 2 to priorities regulation No. II.

• We are unable to continue operations or at least we must greatly decrease our business, due to freezing orders. How can I make a projection of business, based on rated orders, when my business heertofore has been practically on unrated orders and my customers cannot secure high rated orders, even though the product may be considered highly essential to the civilian needs?

A PRP application may be filed on an estimated basis. Of course, a complete and detailed cover letter in duplicate should explain all of the facts surrounding the case.

• I have used my anticipated requirements, with the exception of only a small amount at the end of the quarter, and then got a fair sized order requiring more material than I have left on my authorization. Must I wait ten days or longer to secure authority to place orders for this material, when the time element requires delivery almost at once?

No, you may file a PD-25-f asking for the additional materials.

• What shall I do when I am uncertain as to the amount of metal I will require this quarter? I have the facilities to produce this amount, but have no assurance that I can secure sufficient orders, although I am making a desperate effort to secure large defense contracts.

On the PRP certificate, you should only declare as your requirements, the amount of material you definitely know you can use in the coming quarter, plus approximately a 45-day cushion. If you should, during the quarter, then get additional orders, you may then file a PD-25-f as a request for additional materials to take care of this new business.

• If I take the previous three months as my history period, and then want to file early for the next quarter, can I use part of the three months I have used for the present quarter in filing for the next quarter?

You should take the three months preceding as a historical quarter plus one month as a processing cushion—in other words, if you are filing for the fourth quarter, beginning October, your historical quarter should then be June, July and August, leaving September as the cushion month for processing.

• What do I do when the amount "to be received" is cut below what I need to fill orders?

If you believe the amounts of material that you are authorized to purchase on your PD-25-a is below what you are actually going to require and you feel that all of your products are high from the standpoint of essentiality, you should file a PD-25-f as an appeal for the difference in quantities.

• How long is the time required to process the form and return their ratings?

Approximately ten days to two weeks.

• How do you obtain material needed for a rush job with a high rating?

PD-25-f, with a cover letter in duplicate stating the urgency of the situation.

• Several have asked if column 10 should be in dollars on "E" as it is asked for on "F."

Column 10 section "E" should be reported quantitively, while column 10, section "F" should be reported in dollars.

Steel Directives Viewed as Solution to Distribution Jam

Pittsburgh

• • • **Directives for all** steel products to be issued by the WPB in order to balance out steel production means that the government has assumed complete control of the distribution of steel ingots, according to opinion here.

According to information reaching here the WPB plans to knock out all so-called allocations for steel products as the new directive system goes into effect. Orders will then be filled by steel companies in accordance with the priority rating attached to the order. The new sequence of priority ratings will be as follows: AAA, AA-1, AA-2, AA-3, AA-4, A-1-a, A-1-b, etc. That means that those consumers holding A-1-a ratings can not get their requirements until all higher ratings are filled. With allocations "out the window" the determining factor in production will be the directive issued against a mill for specific products. Then the mill will produce under that directive and fill its orders in sequence of the priority ratings shown above. This action may effect the entire PRP plan which is predicated on A-1-a being the highest preference rating.

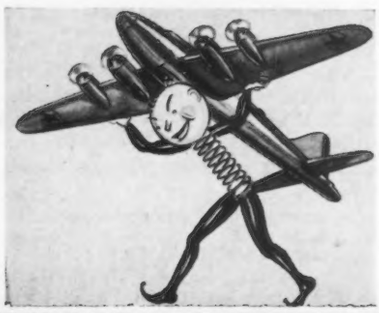
The difference between plate allocations and the recently announced directive control is negligible. Steel companies will be told how much of a given steel product is to be made in a month or a quarter and must immediately earmark sufficient steel ingots to assure this quota being turned out. Hence, there is a chance that some orders bearing less than A-1-a may be produced since under a directive for a given steel product, that mill will operate within the framework of the priority system.

For the past several months the experiment on directives has been going forward. An early step was taken on steel structural shapes wherein the mills were told how much to make each month and were then to take their orders in sequence of their priority status. Next came shell steel and more recently car axles and some bars were placed under directives with tin mill products slated for this treatment. Within the past two weeks, some steel companies found that close to 90 per cent of their shipments constituted either allocations or directives.

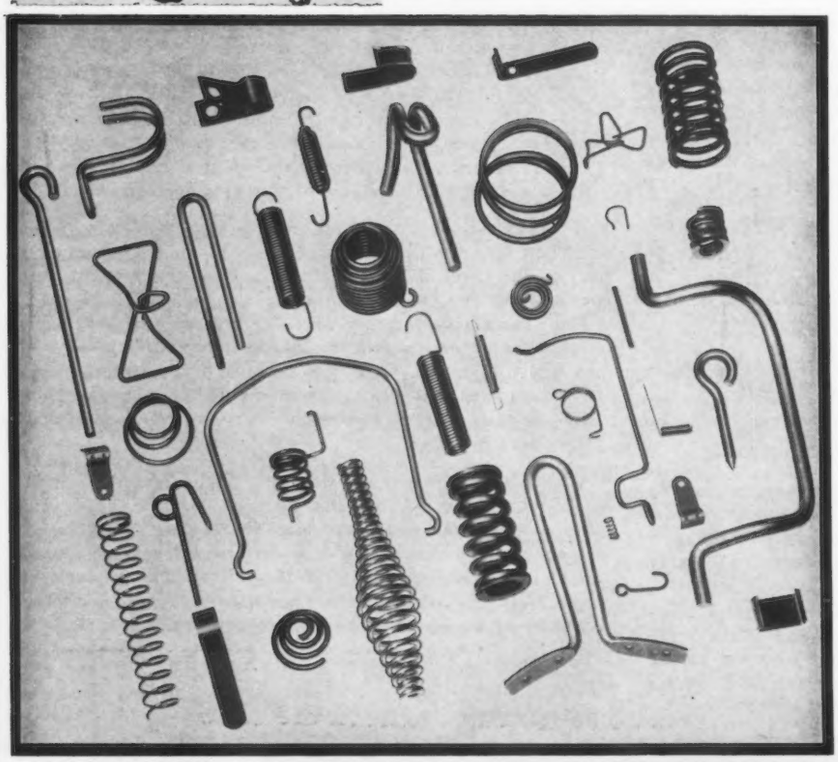
Steel makers here believe that the WPB's action in going over to directives on various steel products is the most realistic attack on distribution problems yet made, but warn that the bottleneck on future successes may be the slabbing and blooming capacity. With accent on the finished product, there is a chance that quotas for the latter may not take into account the limiting factor of available slabs or blooms.

Certain it is that WPB has taken a big load on its shoulders. Reports reaching THE IRON AGE indicate that WPB has put tremendous pressure on many steel

Springs for WAR JOBS!



Whether it's made from round or flat wire . . . whether it requires welding, pointing or threading . . . whether it is a spring or wire shape or combination of both . . . Cuyahoga Spring Co. can make it.



IF YOU NEED SPRINGS FOR WAR JOBS

Cuyahoga's broad experience in designing and manufacturing springs, wire parts and small stampings is available for direct war or sub-contractor requirements.

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10280 BEREA ROAD

CLEVELAND, OHIO

companies for more men to come to Washington. It is said on good authority that WPB now is seeking the "man down the line" who knows what various steel mills can do and how to schedule such production so that as much theory as possible is eliminated from the picture. WPB is demanding—and it looks like it may obtain—some of the best of steel personnel skilled in scheduling and analyzing various mill outputs. WPB may soon have a corps of experts on steel production and distribution who are familiar with all the steel plants in the country. Some of these men are expected to be assigned to specific steel companies in order to assure that the recently approved plan of directives will not bog down.

Observers see that when present priority ratings will not assure the production of a given product under a directive for the mill making such product, WPB will have to decide whether the rating shall be raised in order to find a place on the schedule or whether it should wait. This, it is said, is where the "end use" symbols will prove their worth. If the customer is unable to get steel and is shutting down some of his plant because an A-1-a is not high enough, the WPB will scrutinize the "end use" symbols and may order an AAA, AA-1, or AA-2 rating.

Such a move may well eliminate such things as 650 freight cars being held up because the car maker with an A-1-a needs a few hundred tons of bars, can't get them, and as a result cannot go forward on the urgent order even though he has everything but the bars. Or, again it may be that the propulsion equipment maker who makes important items for sorely needed ships will not have to close down his plant because he can't get steel on an A-1-a rating since his supplies are almost entirely on allocations and directives. In cases like these it is expected that WPB will, without delay, issue new top reratings.

In Washington last week Reese H. Taylor, Chief of the WPB Iron and Steel Branch, formally announced the establishment of a new quota system (see THE IRON AGE, July 16, page 78) for each of the various steel products and for each producer, to balance steel production. By establishing quotas for each product and for each producer, he said that maximum necessary output of each product will be possible. The recent emphasis on semi-finished steel for shipment abroad, plates, shapes, alloys, rails and rail accessories and tin plate have resulted in diversion of steel from bars, sheet, pipe, wire and similar products.

It has been the practice in recent months, it was stated, to obtain the greatest tonnage of steel plates without regard to the effect of the diversion of steel on other products and the plate program largely was blamed for steel product unbalance.

The new quota assignment policy will not mean a decline in plate production necessarily. The relative need for other products and the overall supply of steel ingots will determine this. Producers will have to fill their quotas

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MODERN *Electric Propelled* INDUSTRIAL TRUCKS

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- FORK AND RAM TRUCKS
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- COIL AND SHEET HANDLERS
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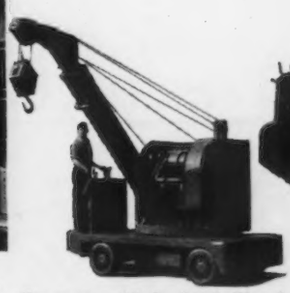
Capacities 1000 to 60,000 lbs.

Low Lift Skid Platform Type

Fork and Ram Trucks
Telescopic and Non-Telescopic for Pallet and Coil Handling



Cranes — Motorized Slewing Type—*Four Motor Control for Individual and Simultaneous Operation*

High Lift Skid Platform Type

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Die Handlers Heavy Duty Type *with motorized die and unloading platform*

Coil and Sheet Handlers

REQUEST DETAILS AND LITERATURE

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AUTOMATIC TRANSPORTATION CO.

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of other products before they turn out any over-quota plates. Care, however, will have to be taken in arranging such quotas or trouble may be encountered. Where a producer has unusually large finishing capacities for one product, plate for example, it may develop that the plate quota will be completed long before other quotas, and since over-quota production is not permitted, plate operations will have to be curtailed until quotas are completed on other mills.

Thus, WPB has directed attention to the fact that the present plate demand of 1,200,000 tons monthly can be adjusted to existing rolling facilities as reported in THE IRON AGE of July 9, on page 72. Expansion, however, is underway with five mills to be completed in 1944, these mills primarily designed to augment plate production.

•

WPB Realignment

• • • **An amendment to WPB** Regulation No. 1, delegated to the newly created office of Director for General Operations priority powers of the WPB Chairman. These powers were formerly delegated to the Director of Industry Operations.

Under the first administrative order implementing plans announced by Chairman Nelson for realignment of WPB, the functions of the Division of Industry Operations were placed under the Director General for Operations. The amendment therefore makes a corresponding change with respect to the powers formerly exercised by the Director of Industry Operations. These powers include both authority to issue priority orders and regulations and power to delegate rationing authority with respect to specified areas or commodities to OPA.

•

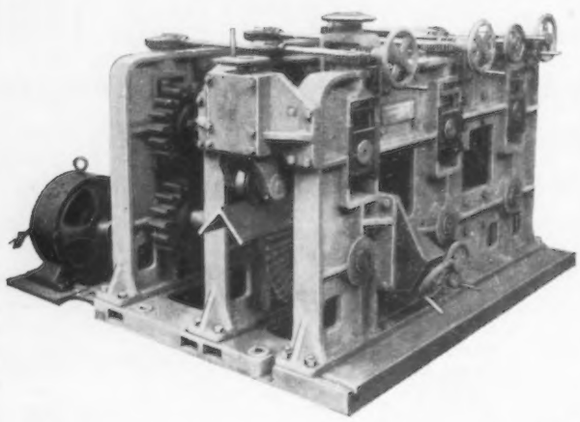
WPB Branch Dissolved

• • • **Dissolution of the** Special Industrial Machinery Branch of WPB was announced by the Director of General Operations who said that the work of the six sections of the branch which were continued had been assigned to other branches.

The six machinery sections that have been continued are: Food Processing, Pulp and Paper, Printing and Publishing, Petroleum, Chemical and Allied, Textile and Shoe and General Industrial. These have been placed under appropriate materials branches of the WPB.

Orders originating in the Special Industrial Machinery Branch will be administered in the future by other WPB branches. L-83, imposing general restrictions on distribution of industrial machinery, will be administered by the Appeals Branch under the direction of A. E. Collins. L-159, relating to plastic machinery, will be administered by the Chemicals Branch under the direction of James A. Lawson. L-143, dealing with tire machinery and equipment will

Thomas Angle Planer
• • for Shipyards



Capacity for angles up to 8" x 8"

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THIS Thomas motor-driven unit is designed for planing, either straight or to any angle desired . . . a vital help in today's urgent ship or barge construction. Easy to operate, speeds production, gives maximum service! Thomas builds equipment for any special metal-forming or fabricating need. Write.

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be administered by the Rubber Branch under Harry S. Rogers. P-53, relating to priority assistance for manufacturers of textile machinery, will be administered by the Textile Branch under R. S. Dempsey.

•

Farm Machinery

• • • **For codifying** the original order and amendments, WPB reissued Order L-26 which regulates production of all types of farm equipment. The amended order brings into one document the original order and the four amendments that have been made to it, and expires Nov. 1. Except for minor corrections in language, there are no other changes. Supplementary orders L-26-a, b, c and d with their amendments remain in full force and are not affected by this codification of the original order.

•

Metal Signs

• • • **Manufacturers of** metal signs may dispose of frozen inventories of iron or steel, by amendment No. 2 to order L-29. Disposal of such inventories is permitted and conforms to Priorities Regulation No. 13. Under this regulation manufacturers may sell, without formalities, iron or steel inventories frozen by the order to the Army, Navy, Maritime Commission, Board of Economic Warfare, Commodity Credit Corp., Defense Supplies Corp., Metals Reserve Corp., or Rubber Reserve Corp.

The amendment also rescinded the provision in L-29 which required any manufacturer of metal signs to file with WPB by July 15 a complete report of his inventory of iron and steel and all other metals in raw or semi-processed form held for use in the production of signs and accessories.

•

PRP Exemptions

• • • **Smelters and refiners** of 13 metals operating under order P-73 need not file PRP applications for the 3rd quarter of 1942, WPB announced. The processors of these metals will continue to operate under P-73 for this period. Pending completion of a uniform system to handle these applications, P-73 will apply to all smelters and refiners. All serially numbered copies of P-73 have been extended to Oct. 1, 1942.

• • • **Prime contractors** to whom preference ratings have been assigned on PD-3-a certificates for the armed services or other war agencies are entitled to use the ratings within specified units for operating supplies and to replace materials in inventory, it was explained by WPB in an interpretation of priorities regulation No. 3.

A recent amendment to the regulation provided that any preference rating may be extended to cover operating supplies used in processing materials to fill the rated order up to a value of 10 per cent of the order, provided that not more than 25 per cent of such operating supplies or materials in the forms described in the metals

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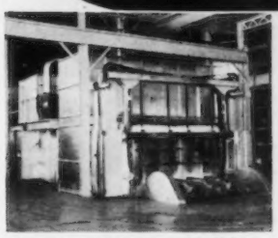
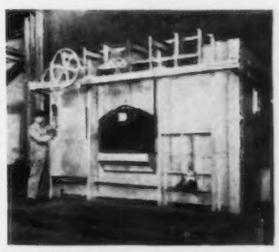


Large-capacity air recirculating furnace with chain conveyor.



Reverberatory bronze melting furnace arranged for front or top charging.

Over- and under-fired car-type annealing and normalizing furnace.

Speeding Production Cutting Costs!

Aircraft . . . Ordnance . . . Machine Tools . . . Ships . . . wherever production speed is important, Dempsey furnaces are vital factors in every phase of heat-treating. Regardless of whether the problem involves a small or a large furnace, Dempsey engineers will solve it . . . individualize the installation to meet it exactly. That is why Dempsey Industrial Furnaces have been chosen by so many industrial plants engaged in war production. Let us suggest how we can be helpful in solving your problem.

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Continuous normalizing, annealing and heat-treating furnace.

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Hack Sawing the MARVEL Way is Metal Cutting the Most Economical Way!

There is no cheaper method for cutting off identical pieces from bar steel than with a MARVEL Automatic Production Saw because it provides:

1. Greatest number of pieces, floor to floor, per cost-dollar.
2. Lowest equipment and tool cost.
3. Minimum labor cost. Requires no more attention than an automatic screw machine.
4. Lowest chip loss (more pieces per bar).

The MARVEL System of Metal Cutting provides exactly suited equipment for the requirements of every shop or plant, as well as the non-breakable (composite) MARVEL High-Speed-Edge Hack Saw Blades, which permit far greater speeds, feeds and blade tension. This complete line of advanced equipment is changing shop practice and production methods everywhere by making sawing more economical and more efficient than other methods.

Your local MARVEL Sawing Engineer will gladly analyze your metal cutting problems and point out where you can cut costs with the MARVEL System or we will gladly send bulletin on any of the following:

1. MARVEL No. 1, Dry Cutting General Purpose Saw (4" x 4" cap.)
2. MARVEL No. 2, General Purpose Hack Saw (8" x 8" cap.)

4B. MARVEL No. 4B, Light Duty, High Speed Saw (6" x 6" cap.)

6. MARVEL No. 6, Heavy Duty, High Speed Saw (6" x 6" cap.)

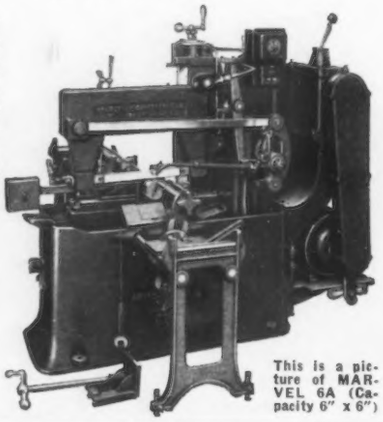
6A. MARVEL No. 6A Automatic Production Saw with Automatic Bar Push-up (6" x 6" cap.)

8. MARVEL No. 8 Metal Cutting Band Saw (18" x 18" cap.)

9. MARVEL No. 9 Heavy Duty High Speed Saw (10" x 10" cap.)

9A. MARVEL No. 9A Automatic Production Saw with Heavy Duty Bar Push-up (10" x 10" cap.)

18. MARVEL No. 18 "Giant" Hydraulic Hack Saw (18" x 18" cap.)



This is a picture of MARVEL 6A (Capacity 6" x 6")

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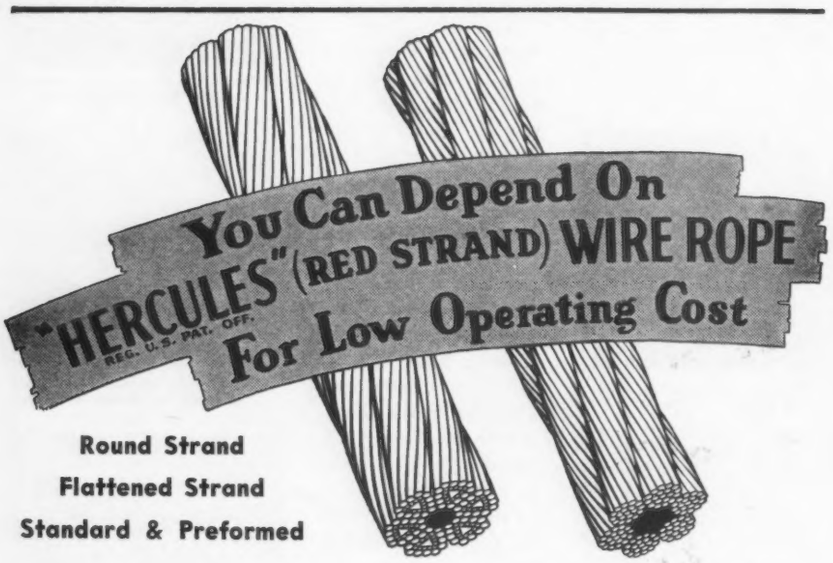

Round Strand

Flattened Strand

Standard & Preformed

WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

Made Only By **A. LESCHEN & SONS ROPE CO.** *Established 1857*

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list of priorities regulation No. 11 is used.

The interpretation makes it clear that "extension" of a rating includes use of the rating by the contractor to which it is assigned as well as by his supplier, and therefore he may take advantage of the provisions with respect to operating supplies.

•

Cast Iron Soil Pipe

• • • **WPB Plumbing and Heating** Branch announced that standard, medium, and extra heavy weight cast-iron soil pipe in stock June 1 may be sold and installed without violating the provisions of Schedule IV to order L-42.

It was emphasized, however, that no type of metal pipe should be used where pipe made of other materials is available. The Emergency Plumbing Standard for War Housing, calling for use of vitreous clay or concrete pipe in certain parts of the installations, must be followed.

•

Tin Plate Uses

• • • **Tin and terne** plate in process on May 16, and roofings, furnace pipe and fittings in inventory on May 16, may be used for repairs regardless of ratings, and on defense housing under an amended version of order M-21-e, issued by WPB. The amended order also adds certain items to the list which may be made of tin or terne plate and relieves warehouses of the necessity for reporting to WPB on Army and Navy orders, but does require the warehouse to obtain a certification from its customer on these orders.

Schedule A of the original order, listing products that may be made of tin and terne plate is extended by the addition of dairy ware and other specified items equipment. The net effect of the amended order is to unfreeze certain inventories and to permit additional uses of tin and terne plate because the items permitted fill a necessary place in both military and civilian economy.

•

Coke By Products

• • • **Xylol and xylol** range aromatic materials produced as by-products of toluol manufacture

have been placed under the control of order M-50 to remove the resulting commercial inequalities that arose between the petroleum and coal-tar producers.

The order restricting the sale and delivery of xylol to orders bearing a preference rating of A-2 or higher originally defined these products as "of petroleum origin."

•

Obtaining Reratings

New procedure for obtaining higher priority ratings for materials required to complete oil field construction projects already under way was explained. Previously, when a contractor could not complete construction because material delivery was being held up because the original priority rating no longer was high enough, the contractor applied for a higher rating on form PD-1-a.

Now, application for higher priority rating need not be made on form PD-1-a. Correct procedure is to write a letter in quadruplicate in which is listed all material items requiring a change in preference rating status. Thus, requests for changes in ratings can now be made in one application, whereas previously a separate PD-1-a form had to be made out for each class of items. In compiling the list of materials in the single application, under the new procedure, however, applicants are requested to itemize the materials in accordance with the PD-200-a materials list.

The letter should also include information showing builder's serial number, item number, unit of measure, quantity, price, and use of item; latest delivery date permissible, and preference rating required by the supplier to meet the delivery date.

• •

Over Quota Orders

• • • Manufacturers with orders standing on suppliers books may request suppliers to retain those orders for future delivery if the material ordered is in excess of the authorized quarterly purchases under PRP, according to an interpretation of priorities regulation No. 11. The order requires manufacturers to cancel or reduce outstanding purchase orders to the amount authorized by their PRP certificates, but the interpretation points out that notification to suppliers to hold excess orders on the books for future delivery is permissible.

•

Canada PRP Deadline

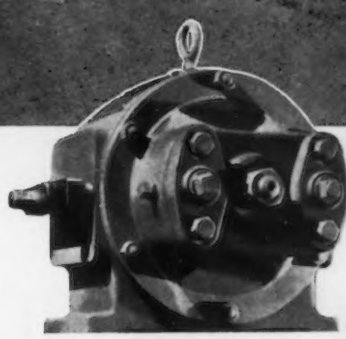
Toronto

• • • C. D. Howe, Minister of Munitions and Supply, announced that the zero hour for filing quarterly quota applications under the Production Requirements Plan, the new Canadian priorities system to speed war production, has been set for midnight July 31. After that date, Mr. Howe stated, any Canadian manufacturer using $5000 worth of metals in three months will be denied the right to purchase metals in the United States until his quarterly quota application is on file with the Priorities Officer of the Department of Munitions and Supply in Ot-

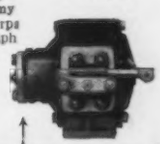
IT'S A CINCH IN A TANK!

Hele-Shaw Fluid Power also simplifies reversing. Takes jars and jerks out of machines.

Are you designing, building, or operating a machine using a motion that must be reversed? If you can do the job hydraulically and you want to make the reversal smooth as silk, figure on the possibility of using Hele-Shaw Fluid Power. Hele-Shaw Fluid Power is generated in a Hele-Shaw Pump. The pump develops high pressure in an oil medium. Rotary, radial, multiple cylinders smooth out the pulse of the oil. Several types of Hele-Shaw controls are available which reverse the direction of the flow of oil instantly at the pump. With a Hele-Shaw Pump and a Hele-Shaw Control a face grinder manufacturer has eliminated reversing valves, taken the jerks and jars out of his table drive. Our catalog tells many more advantages of Fluid Power. Let us send you a copy.



Official U. S. Army Signal Corps Photograph



Hele-Shaw Pump with Type D Regulator — This, one of many Hele-Shaw regulators, reverses the direction of flow, gives any rate of discharge from zero to maximum in either direction independently of pressure.

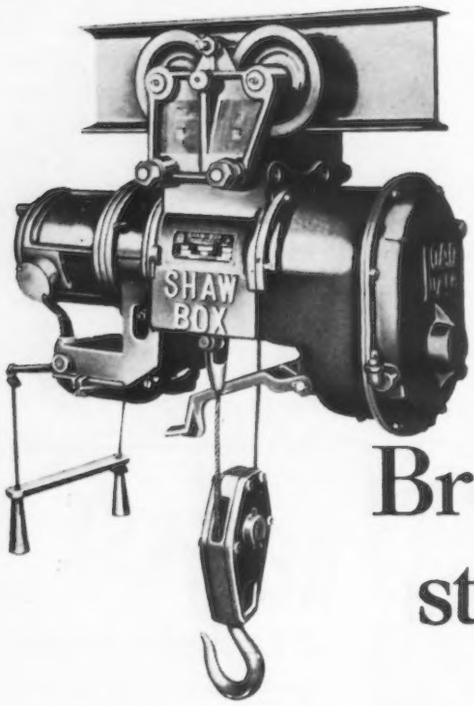
20-TON RIFLE BARREL STRAIGHTENER, manufactured by the Watson-Stillman Company. Operated by a Hele-Shaw Pump equipped with a Type D Control. →

THE **Hele-Shaw** *Fluid Power Pump*

OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, LO-HED HOISTS

AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE • PHILADELPHIA, PA.

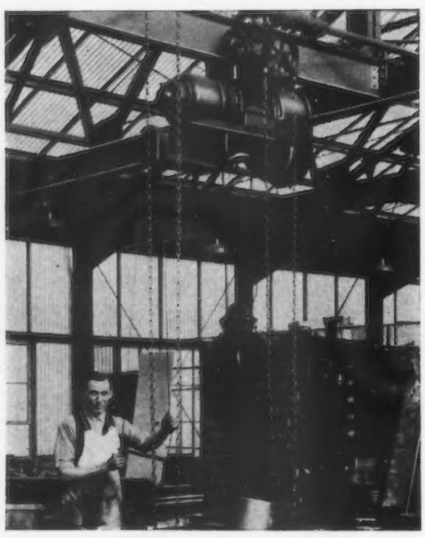


Brute for strength...

YET this rugged hoist embodies all that is fine in design and engineering. For the tough round-the-clock job, for trouble-free service and for versatile adaptability, you can do no better than install a Shaw-Box Load Lifter Hoist.

Here are some features:

1. "One-point" lubrication.
2. Hyatt Roller Bearings and Ball Bearing Motor.
3. Safety upper stop; lower blocks; sure brakes.
4. Two-gear reduction drive; sealed against oil leaks; steel interchangeable suspension.



'Load Lifter' electric hoists are built with lifting capacities of 500 lbs. to 40,000 lbs. in all combinations required for industrial lifting necessities. They are adaptable to almost every working condition within their capacities. Send for Bulletin 350.

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'LOAD LIFTER' *Hoists*

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Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

tawa. The ruling, he stated, will apply equally to war industries as well as to those making civilian articles.

"From the reports received by the end of the month, Washington and Ottawa will have a much clearer picture of the requirements of the two nations, and with this picture as a guide, the available metals will be allotted. At the top of the preference list will be the direct war needs. Whatever is left over will be divided among the essential industries, and if there is still a small balance—which, in the instance of most critical metals, is most unlikely—the less essential industries will get it," the Minister stated.

•

Lithium

• • • **Complete allocation** for lithium compounds was ordered, effective Sept. 1, 1942, by the WPB. Deliveries of 25 lb. or less in any month are exempted from the restrictions of the order, M-191. Monthly requests for lithium compounds will be made on form PD-585, and producers reports will be on form PD-586.

•

Hand Tools

• • • **The WPB claimed that** its hand tool simplification order, L-157, will lead to concentration of productive facilities for the manulease forging presses and other production facilities for the manufacture of war goods, will release forgings of various kinds, and will add to the industry's capacity for heat treating armor plates.

Except for shovels used in mining operations, the use of alloy steel is prohibited in shovel manufacture. The order will reduce inventories in hands of manufacturers and distributers; make possible a more orderly purchasing policy on the part of manufacturers; and will "facilitate rolling mill schedules."

First tools to be covered by the order are hand shovels, spades, scoops and telegraph spoons. After Aug. 9 no material for their manufacture may be supplied to any producer unless it conforms to the standards set forth. After the end of August, tools may not be manufactured or delivered if they do not conform to the order.

Steel "Shortage" and Sponge Iron Will Be Topics of New Inquiry

Washington

• • • **The staff** of the Truman special Senate Committee investigating the national defense program still is gathering material for use at the committee's forthcoming steel investigation. No date for the inquiry to begin has been set. At the committee offices it was said it is expected that the proceedings will start in about two weeks.

The investigation, it was stated, will be an "overall" study of the entire steel situation. Particular emphasis, it was intimated, will be placed on the inquiry as it relates to a so-called steel shortage and the feasibility of developing the sponge iron process for the production of scrap steel. Present indications are that many steel executives and members of the WPB Iron and Steel Branch will be called.

The investigation will be conducted by a three-man subcommittee headed by Senator James M. Mead, Democrat of New York. While the names of the other two members have not been officially designated, it is reported that they are Senator Mon C. Wallgren, Democrat of Washington, and Senator John H. Ball, Republican of Minnesota.

The Maritime Commission's order stopping construction at the large Higgins Corp. shipyard at New Orleans has been seized upon by those pressing it as further justification for the investigation. The Commission attributed the order to the need for utilizing all available steel in shipbuilding in existing shipbuilding plants and facilities. It was added that further plant expansion programs must be curtailed, and that WPB had concurred with the Commission in the decision and directed curtailment in the use of steel.

Angered by the order, which canceled a contract for 200 Liberty ships, Andrew J. Higgins, head of the Shipbuilding Corp., said that the Commission "knows that its excuses are mere pretexts." He suggested that the real reason is "that we can build ships faster and cheaper than any plant in the world," a claim that the Kaiser yard on the Pacific Coast also makes. Higgins also assailed the WPB for its action.

HERE'S YOUR COMPETITION TODAY

The ENEMY is our competition today. Our competitors are Germany, Japan and Italy. *And unless we lick that competition we will never again be free to compete with each other.*

We've got to meet this stiffest of competition on two fronts . . . the fighting front and the production front. Co-ordination of the highest order must be applied to the job.

To back up our men who will do the real fighting, we must make maximum use of all essential materials and of every production facility which we have behind the lines.

We must use every man not needed in the fighting forces—and women, too. Older men, now retired, must come back to the job. We must use old machinery as well as new, small plants as well as large, 24 hours a day, seven days a week.

Remember, there's a shortage of time . . . we have no surplus of skill in management and labor . . . no surplus of materials. It will take *all* of these we have.

Geo. P. Trundle Jr.

P. S. Today it's 100% war work for every consulting management engineer on our staff.

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

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OPA Insists Its Prices Govern Public Sales of Machinery

Washington

• • • **Partly abandoning** its policy of attempting to make its ceiling prices govern actions under the Bankruptcy Act, OPA last Wednesday formalized this action in Supplementary Order No. 10. However, OPA is insisting that its maximum prices still govern in the liquidation sales made under court order by receivers, trustees in bankruptcy in the case of new and second hand machine tools, farm equipment or scarce commodities which are subject to government rationing or allocation, and to businesses conducted by a trustee including sales by sheriffs, constables, bailiffs, or marshals.

The commodities which remain subject to price regulations are as follows: New or second-hand machine tools; new or second-hand machines and parts having an appraised value of more than $250; farm equipment; second-hand farm equipment having an appraised value in excess of $100, and commodities the sale or transfer of which is subject to rationing, allocation or limitation order, such as household refrigerators, aluminum scrap, copper, etc.

The exemption does not extend to private auctions or sales not held under direct court order.

•

Salvage Handlers Exempted

Washington

• • • **The following** deliveries and sales by salvage handlers have been exempted from the provisions of General Maximum Price Regulation by OPA:

"By persons engaged in reconditioning and selling damaged commodities received in direct connection with the adjustment of losses from insurance companies, transportation companies or agents of the United States Government, provided such persons have registered with and have been approved by OPA as engaged principally in such business and whose other activities do not include selling new or second-hand commodities for their own account."

Under the order as previously amended, it was found that some persons who were in the salvage business, but also engaged in appraising, surveying, auctioneering, etc., could not comply with the exemption.

The new wording will exempt some of these. The exemption will not be broad enough, however, to exclude from the regulation sales and deliveries by persons who also buy and resell new and second-hand commodities for their own account.

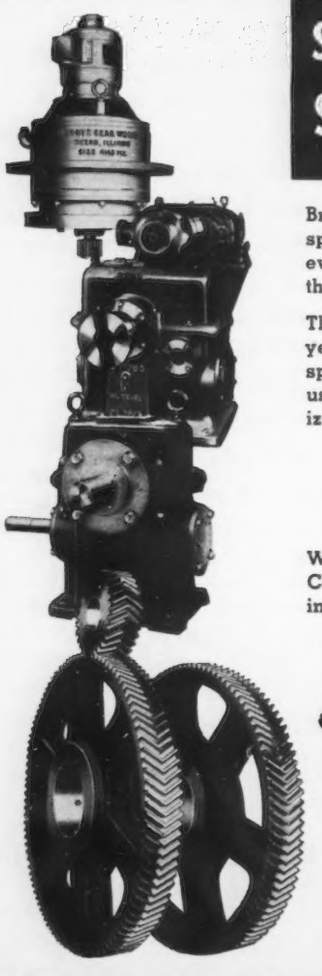
•

Calumet Granted Relief

• • • **Order 15** under Revised Price Schedule No. 6 grants relief to a company which ordinarily re-rolled steel bars but under present conditions is unable to procure such re-rolling materials. The

Brad Foote

SPECIAL CUT GEARS
SPEED REDUCERS



Brad Foote products, special cut gears and speed reducers are turning the wheels in every conceivable industry manufacturing the material so urgently needed today.

Their uninterrupted performance, the many years of specialized research, experience in speed reduction gear manufacture and unusual plant facilities have made this organization one of the most important of its kind.

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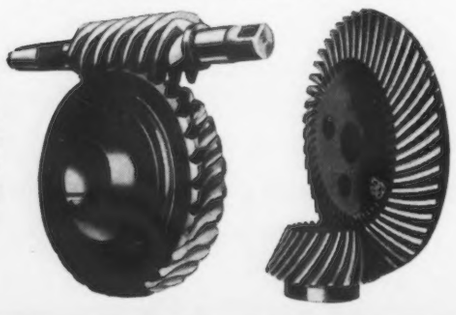

BRAD FOOTE GEAR WORKS
1301 S. CICERO AVENUE • • • CICERO, ILLINOIS

price action approved by OPA recognizes high material costs to a company which now is using short sized billets, a more expensive material.

The order provides that Calumet Steel Division, Borg-Warner Corp., Chicago Heights, Ill., may sell and deliver, and agree, offer, solicit and attempt to sell and deliver carbon steel merchant bars produced on its 8-in. bar mill at a price not in excess of $2.35 cwt., base, Chicago, effective July 15.

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Fluorspar Action

• • • **The Navajo Fluorspar Mines,** of Grants, N. M., has been granted authority to sell fluorspar crude ore having a 70 per cent CaF_2 content on a dry basis at a maximum price of $10 per net ton, f.o.b. Grants.

Maximum prices could not be established for the company's production of this grade of fluorspar ore under 1376.1 (a) (1) and (2) of maximum price regulation No. 126 (fluorspar) as neither the company nor any other producer in its area previously shipped crude fluorspar ore to eastern processing mills.

The establishment of the price for this particular grade of ore produced by the Navajo Fluorspar Mines was contained in order No. 4 under regulation No. 126. The order is effective July 15.

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Price for New Material Set

• • • **A schedule** of maximum prices for a new composition duct material for use in ventilating systems, which will replace vitally needed metals, has been established by OPA. The new product will be used for conducting air in heating and cooling systems. It was developed by the Chrysler Airtemp Sales Corp.

The establishment of the maximum prices was contained in Order No. 30 of the General Maximum Price Regulation. The schedules become effective July 14.

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Copper Alloy Scrap Prices

• • • **Reductions** in maximum prices for 13 classifications of copper-alloy scrap were announced July 17 by OPA in Amendment No. 1 to Revised Price Schedule No. 20, as amended. They are:

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Red Trolley Wheels—to 10.75 cents per pound from 11 cents.

Aluminum Bronze (Ford) Gears—to 9 cents per pound from 9.25 cents.

Soft Red Brass (No. 1 Composition)—to 9 cents per pound from 9.25 cents.

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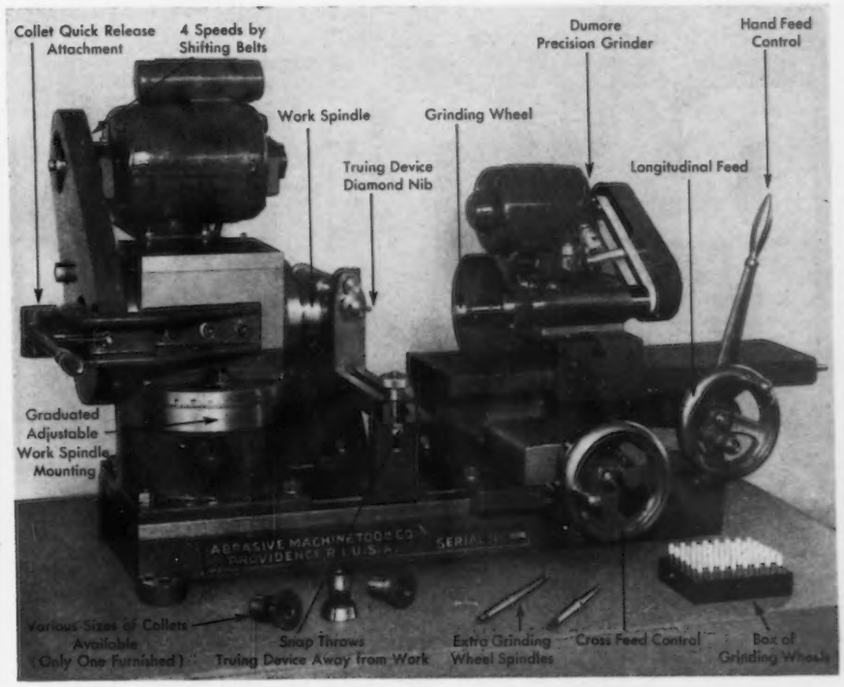
The reductions were made, the Price Administrator said, because of the need for bringing scrap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ABRASIVE MACHINE TOOL COMPANY

Dealers in Principal Cities

EAST PROVIDENCE · · · RHODE ISLAND

prices more in line with those for electrolytic copper, and with the proposed new price schedule for brass ingot. The present reductions in scrap prices are less than the contemplated reductions in brass ingot.

The amendment which also embodies several other changes in the schedule becomes effective July 21, except as to the price reductions, which do not take effect until Aug. 17. The Price Administrator warned that no contracts may be carried out or inventories liquidated after that date at prices higher than those provided in Amendment No. 1.

•

Nonferrous Scrap Prices

• • • **Simplification** of the procedure for determining permissible transportation charges on zinc, lead, copper, brass mill, aluminum and nickel scrap when delivered from the point of shipment to the purchaser in the seller's own conveyance, has been made by OPA.

In the past, certain non-ferrous metal scrap price schedules provided that whenever delivery was made in the seller's conveyance, the transportation charge should not exceed the charge which would be applicable on an identical shipment from the same point of shipment to the same receiving point at the lowest available commercial transportation rate.

Amendments to the six non-ferrous metal scrap price schedules just issued now provide that when transportation to the buyer's re- [illegible] vehicle owned

mouth are exempted from the restrictions of the order, M-191. Monthly requests for lithium compounds will be made on form PD-585, and producers reports will be on form PD-586.

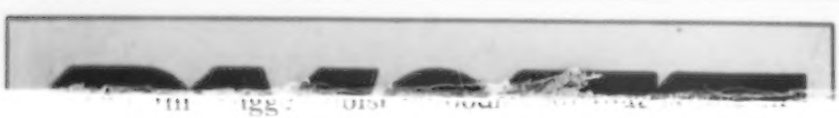
•

Hand Tools

• • • **The WPB claimed that** its hand tool simplification order, L-157, will lead to concentration of productive facilities for the manu- lease forging presses and other production facilities for the manufacture of war goods, will release forgings of various kinds, and will add to the industry's capacity for heat treating armor plates.

Except for shovels used in mining operations, the use of alloy steel is prohibited in shovel manufacture. The order will reduce inventories in hands of manufacturers and distributers; make possible a more orderly purchasing policy on the part of manufacturers; and will "facilitate rolling mill schedules."

First tools to be covered by the order are hand shovels, spades, scoops and telegraph spoons. After Aug. 9 no material for their manufacture may be supplied to any producer unless it conforms to the standards set forth. After the end of August, tools may not be manufactured or delivered if they do not conform to the order.



[illegible] design and engineering [illegible] of the tough [illegible] clock job, for trouble-free service and for versatile adaptability, you can do no better than install a Shaw-Box Load Lifter Hoist.

Here are some features:

1. "One-point" lubrication.
2. Hyatt Roller Bearings and Ball Bearing Motor.
3. Safety upper stop; lower blocks; sure brakes.
4. Two-gear reduction drive; sealed against oil leaks; steel interchangeable suspension.

'Load Lifter' electric hoists are built with lifting capacities of 500 lbs. to 40,000 lbs. in all combinations required for industrial lifting necessities. They are adaptable to almost every working condition within their capacities. Send for Bulletin 350.

MAXWELL MM& MANNING MOORE INC TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load-Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

containing 2 lb. of manganese content by weight, are as follows:

	Cents per lb. of briquettes
1—Carload lots, unpacked	6.06
2—Carload lots, packed	6.31
3—Ton lots, packed	6.56
4—Less than gross ton lots:	
(a) Down to 200 lb., packed	6.81
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These maximum prices are f.o.b. the seller's usual shipping point with an allowance to the purchaser for railway freight charges to the point of destination with a provision that this allowance need not exceed freight charges to St. Louis.

•

Boost in Rates Suspended

The investigation will be conducted by a three-man subcommittee headed by Senator James M. Mead, Democrat of New York. While the names of the other two members have not been officially designated, it is reported that they are Senator Mon C. Wallgren, Democrat of Washington, and Senator John H. Ball, Republican of Minnesota.

The Maritime Commission's order stopping construction at the large Higgins Corp. shipyard at New Orleans has been seized upon by those pressing it as further justification for the investigation. The Commission attributed the order to the need for utilizing all available steel in shipbuilding in existing shipbuilding plants and facilities. It was added that further plant expansion programs must be curtailed, and that WPB had concurred with the Commission in the decision and directed curtailment in the use of steel.

Angered by the order, which canceled a contract for 200 Liberty ships, Andrew J. Higgins, head of the Shipbuilding Corp., said that the Commission "knows that its excuses are mere pretexts." He suggested that the real reason is "that we can build ships faster and cheaper than any plant in the world," a claim that the Kaiser yard on the Pacific Coast also makes. Higgins also assailed the WPB for its action.

Amendment No. 12 to Revised Price Schedule No. 67, which provides maximum prices for new machine tools.

•

Machines Exempt from GMPR

Washington

• • • **Machines,** parts and machine works were exempted from the provisions of the General Maximum Price Regulation by OPA on Monday. The overlapping provisions in supplementary regulation No. 2 was removed through the issuance of Amendment No. 4 to that regulation.

•

Mercury Buying Extended

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. Co-ordination of the highest order must be applied to the job . . .

To back up our men who will do the real fighting, we must make maximum use of all essential materials and of every production facility which we have behind the lines.

We must use every man not needed in the fighting forces—and women, too. Older men, now retired, must come back to the job. We must use old machinery as well as new, small plants as well as large, 24 hours a day, seven days a week.

Remember, there's a shortage of time . . . we have no surplus of skill in management and labor . . . no surplus of materials. It will take *all* of these we have.

Geo. A. Trundle Jr.

P. S. Today it's 100% war work for every consulting management engineer on our staff.

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

GENERAL OFFICES · CLEVELAND · BULKLEY BLDG.
CHICAGO · City National Bank Bldg. · 208 S. La Salle Street
NEW YORK · Graybar Building · 420 Lexington Avenue

OPA Insists Its Prices Govern Public Sales of Machinery

Washington

• • • **Partly abandoning** its policy of attempting to make its ceiling prices govern actions under the Bankruptcy Act, OPA last Wednesday formalized this action in Supplementary Order No. 10. However, OPA is insisting that its maximum prices still govern in the liquidation sales made under court order by receivers, trustees in bankruptcy in the case of new and second hand machine tools, farm equipment or scarce commodities which are subject to government rationing or allocation, and to businesses conducted by a trustee including sales by sheriffs, constables, bailiffs, or marshals.

The commodities which remain subject to price regulations are as follows: New or second-hand machine tools; new or second-hand machines and parts having an appraised value of more than $250; farm equipment; second-hand farm equipment having an appraised value in excess of $100, and commodities the sale or transfer of which is subject to rationing, allocation or limitation order, such as household refrigerators, aluminum scrap, copper, etc.

The exemption does not extend to private auctions or sales not held under direct court order.

•

Salvage Handlers Exempted

Washington

• • • **The following** deliveries and sales by salvage handlers have been exempted from the provisions of General Maximum Price Regulation by OPA:

"By persons engaged in reconditioning and selling damaged commodities received in direct connection with the adjustment of losses from insurance companies, transportation companies or agents of the United States Government, provided such persons have registered with and have been approved by OPA as engaged principally in such business and whose other activities do not include selling new or second-hand commodities for their own account."

Under the order as previously amended, it was found that some persons who were in the salvage business, but also engaged in appraising, surveying, auctioneering, etc., could not comply with the exemption.

The new wording will exempt some of these. The exemption will not be broad enough, however, to exclude from the regulation sales and deliveries by persons who also buy and resell new and second-hand commodities for their own account.

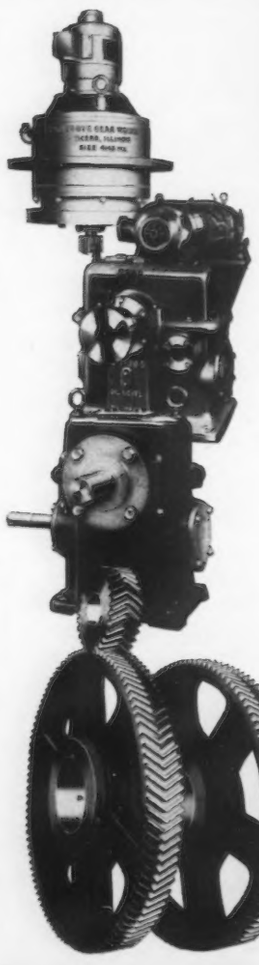
•

Calumet Granted Relief

• • • **Order** 15 under Revised Price Schedule No. 6 grants relief to a company which ordinarily re-rolled steel bars but under present conditions is unable to procure such re-rolling materials. The

Brad Foote

SPECIAL CUT GEARS
SPEED REDUCERS



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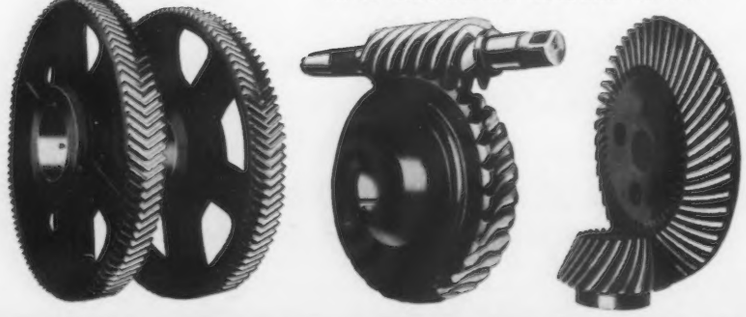

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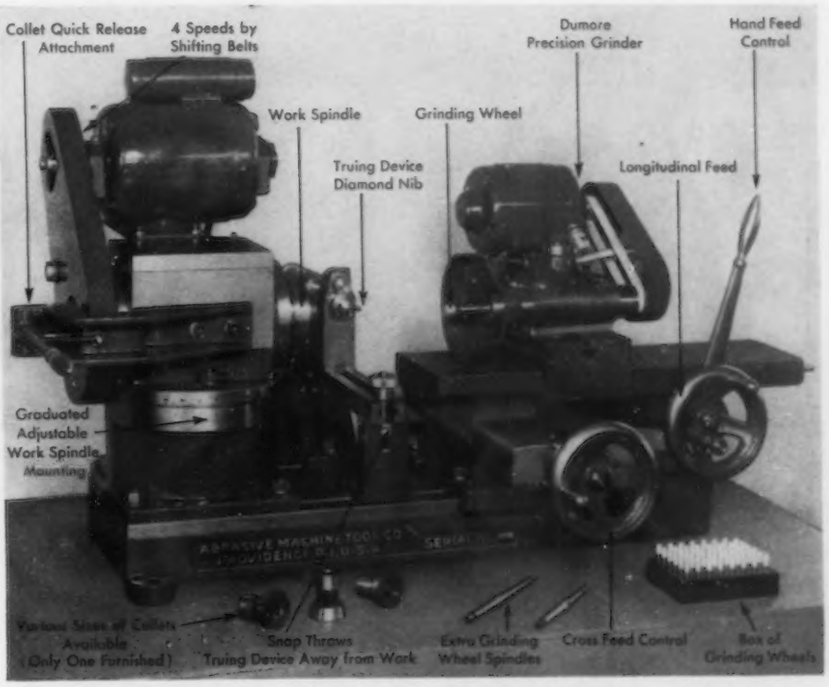
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Amendments to the six non-ferrous metal scrap price schedules just issued now provide that when transportation to the buyer's receiving point is by a vehicle owned or controlled by the seller, or is by private carrier not owned or controlled by the buyer, the following maximum transportation charges are authorized:

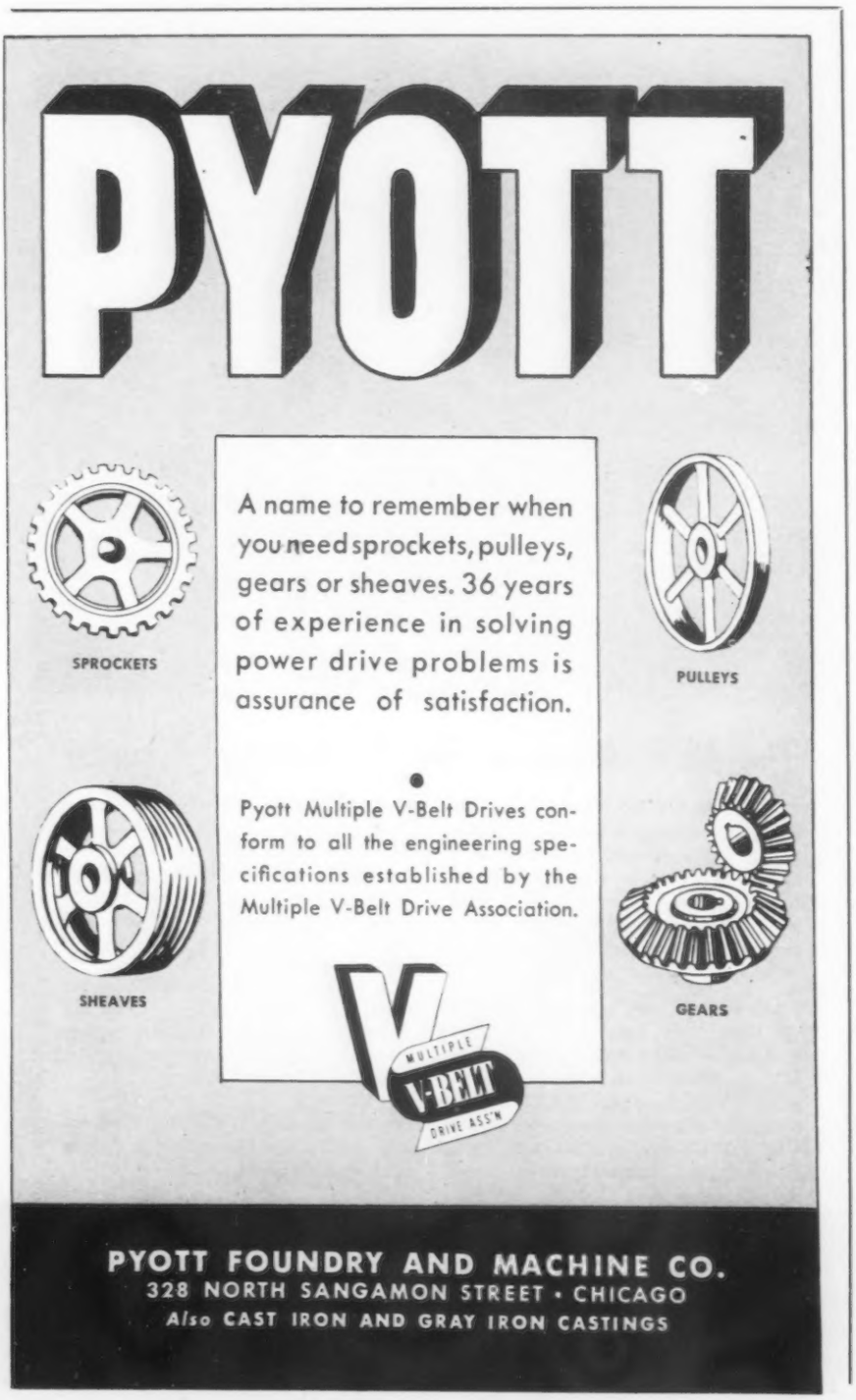
Distance in miles		Dollars per ton	
Over—	But not over—	Aluminum	Other non-ferrous metal
0	10	1.60	1.10
10	15	1.80	1.25
15	20	1.95	1.35
20	25	2.10	1.45
25	30	2.25	1.55
30	35	2.40	1.65
35	40	2.55	1.75
40	50	2.80	1.90
50	60	3.00	2.05
60	70	3.20	2.20
70	80	3.40	2.35
80	90	3.60	2.50
90	100	3.80	2.65
100	110	3.95	2.75
110	120	4.10	2.85
120	130	4.25	2.95
130	140	4.40	3.05
140	150	4.55	3.15
150	160	4.70	3.25
160	170	4.85	3.35
170	180	5.00	3.45
180	190	5.15	3.55
190	200	5.30	3.65
200	210	5.45	3.75
210	220	5.60	3.85
220	230	5.75	3.95
230	240	5.90	4.05
240	250	6.05	4.15
250	260	6.20	4.25
260	270	6.35	4.35
270	280	6.50	4.45
280	290	6.65	4.55
290	300	6.80	4.65

•

Ferromanganese Briquettes

• • • **An amendment** establishing maximum prices for standard ferromanganese briquettes in Maximum Price Regulation No. 138 on standard ferromanganese was announced July 21. It is Amendment No. 1 to Maximum Price Regulation No. 138 —effective July 25.

The maximum prices established for standard ferromanganese when crushed into briquettes weighing 3 lb., with binding material, and


PYOTT
SPROCKETS
A name to remember when you need sprockets, pulleys, gears or sheaves. 36 years of experience in solving power drive problems is assurance of satisfaction.
PULLEYS
Pyott Multiple V-Belt Drives conform to all the engineering specifications established by the Multiple V-Belt Drive Association.
SHEAVES
GEARS
MULTIPLE V-BELT DRIVE ASS'N
PYOTT FOUNDRY AND MACHINE CO.
328 NORTH SANGAMON STREET • CHICAGO
Also CAST IRON AND GRAY IRON CASTINGS

containing 2 lb. of manganese content by weight, are as follows:

	Cents per lb. of briquettes
1—Carload lots, unpacked	6.06
2—Carload lots, packed	6.31
3—Ton lots, packed	6.56
4—Less than gross ton lots:	
(a) Down to 200 lb., packed	6.81
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These maximum prices are f.o.b. the seller's usual shipping point with an allowance to the purchaser for railway freight charges to the point of destination with a provision that this allowance need not exceed freight charges to St. Louis.

•

Boost in Rates Suspended

Washington

• • • **The I.C.C.** has suspended until next Feb. 20 proposed increases in railroad carload rates on iron and steel products, including tinplate and terneplate from eastern points to Pacific Coast ports. Illustrative of the present and proposed rates in cents per 100 lb. are:

From	Present	Proposed
Birmingham	53	91
Chicago	47	85
Pittsburgh	67	103

•

Nickel Anode Prices

Washington

• • • **Maximum prices** for new and partly used nickel anodes sold by nickel platers to the Metals Reserve Co., and for these same materials when sold by the Metals Reserve for nickel plating purposes, were announced on Tuesday by OPA.

On and after July 22, any nickel plater may sell to the Metals Reserve Co. or its authorized agents, new nickel anodes at a price not exceeding 46c. a lb. f.o.b. present location of material. Partly used nickel anodes may be sold at a price not exceeding 43c. a lb., same basis. On and after the same date, the Metals Reserve may sell the same materials at the same prices to any person, designated by the WPB director of industry operations, for use for nickel plating purposes.

•

Machine Tool Makers Aided

• • • **Makers of new** machine tools have been authorized to enter into contracts and make deliveries at prices above established maximum levels while awaiting formal rulings from the OPA on the petitions they must file with OPA when they seek increased prices.

This authority was granted in Amendment No. 12 to Revised Price Schedule No. 67, which provides maximum prices for new machine tools.

•

Machines Exempt from GMPR

Washington

• • • **Machines**, parts and machine works were exempted from the provisions of the General Maximum Price Regulation by OPA on Monday. The overlapping provisions in supplementary regulation No. 2 was removed through the issuance of Amendment No. 4 to that regulation.

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• • • *Unequalled* SURFACE SMOOTHNESS and SPHERICITY

The series of lapping operations performed as a matter of course in the Strom plant give Strom Steel Balls a degree of surface smoothness and sphericity that has always been unequalled in any other regular grade of ball. Only through such unique lapping practice can extreme precision be obtained.

Physical soundness, correct hardness, size accuracy, and sphericity are guaranteed unconditionally in all Strom Balls.

Other types of balls—*stainless steel, monel, brass* and *bronze*—are also available in all standard sizes. Write for catalog and prices.

Strom STEEL BALL CO.
1850 So. 54th Avenue, Cicero, Ill.
The largest independent and exclusive Metal Ball Manufacturer

This Week's Priorities and Prices

Bicycle production order L-52 was amended permitting the manufacture of about 100,000 vehicles between July 1 and Aug. 31. (WPB-1542)

Copper wire in spools may be obtained by a temporary procedure set up for wholesalers and resale for automobile repair. (WPB-1548)

Wholesalers and distributors are exempted from inventory restrictions of order L-63 by exemption No. 7, issued July 16. (WPB-T585)

Builders with project ratings under order P-19, serial numbers above 81, are restricted in use of ratings by amendment No. 1 to order, issued July 16. (WPB-T586)

Lithium compounds are placed under allocation starting Sept. 1 by order M-191, issued July 16. (WPB-T590)

Machine tool builders by amendment 12 effective July 21, may enter into contracts and make deliveries at prices above the ceilings of schedule 67 while awaiting formal rulings from OPA on the petitions they must file when seeking increased prices. (OPA-289)

Non-ferrous scrap transport charges procedure in determining has been simplified when delivered from the point of shipment to the purchaser in the sellers' own conveyance. (OPA-291)

Copper alloy scrap prices, 13 classifications, were reduced by amendment No. 1 to amended schedule No. 20, issued July 17. (OPA-292)

Maximum price exceptions have been granted to four specified bituminous coal mine operations because of clear showing that increasing costs have affected operations. (OPA-311)

Tin and terne plate in process on May 16 and certain products in inventory may be used for repairs regardless of ratings and on defense housing projects by amended order M-21-e, issued July 11. (WPB-T569)

South American copper mines have been granted higher preference ratings by an amendment to order P-58, issued July 14. (WPB-1532)

■ ■ ■

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, **WPB-600** *means announcement* **600** *issued by the War Production Board.)*

Revisions to The Iron Age Priorities Guide

● ● ● The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

Under "M Orders," page 6, add:

M-9-c...Amendment No. 3 (7-10-42) adds a "military exemptions list" to the order to permit manufacture of binoculars and valves for ship use after Aug. 1.

M-21-e...Amended order permits use of tin and terne plate in process and specified products in inventory on May 16 to be used for repair and defense housing, regardless of rating (7-11-42).

M-63-a...Amended order includes shipment by inland waterway in classification of order that may move without restriction if shipped overland or by air from Canada or Mexico (7-15-42).

M-112...Amended order eases restrictions on use of antimony to encourage substitute for tin (7-11-42).

M-150...Amendment No. 1 (7-11-42) controls xylol and xylol range aromatic materials made from coal tar as well as the petroleum derivatives (7-11-42).

M-184...Controls distribution of aniline (7-13-42). Related forms: PD-583 and PD-584.

M-191...Places lithium compounds under complete allocation control effective Sept. 1 (7-17-42). Related forms: PD-585 and PD-586.

Under "P Orders," page 13, add:

P-19...Amendment No. 1 (7-16-42) restricts builders with project ratings under order and serial numbers above 81 in the use of ratings (7-16-42).

P-58...Amended order grants higher ratings for South American copper mines; changes base period on which deliveries are based; and makes order effective until revoked (7-14-42).

P-73...Amended order exempts smelters and refiners of 13 specified non-ferrous metals from filing 3rd quarter PRP applications (7-14-42).

Under "L Orders," page 19, add:

L-23-b...Amendment No. 1 (7-16-42) permits sale of electric ranges to public upon certification as to need.

L-26...Amended order regulates farm equipment production and brings into order the four amendments thus far made to it (7-14-42).

L-29...Amendment No. 2 (7-15-42) provides for disposal of frozen iron and steel inventories by metal sign manufacturers.

L-39...Amended order imposes further restrictions on the manufacture of fire protective equipment (7-11-42).

L-42...Interpretation of Schedule IV permits sale of standard, medium, and extra heavy cast iron soil pipe in stock June 1 (7-13-42).

L-52...Amendment No. 1 (7-17-42) permits manufacture of specified number of Victory model bicycles between July 1 and Aug. 13, 1942.

L-59...Amendment No. 2 (7-11-42) cuts metal plastering bases and accessories production during the four months beginning July 1 to 9250 tons, and sets quotas for manufacturers.

L-62...Amendment No. 3 (7-11-42 permits assembly of venetian blinds until next September from fabricated metal parts on hand as of March 20, 1942, providing parts do not contain more than 2 per cent aluminum, and blinds contain less than 15 oz. of metal.

L-63...Exemption No. 7 (7-16-42) exempts wholesalers and distributors in U. S. territories and possessions from inventory restrictions of order.

L-89...Controls manufacture of elevators and parts (7-9-42).

L-92...Interpretation No. 1 (7-17-42) states order does not apply to lures, baits, or flies if no critical materials are used.

Under "Priority Regulations," page 33, add:

No. 1...Amended regulation delegates powers of WPB Chairman to newly created office of Director General for Operations (7-14-42).

No. 3...Interpretation No. 1 (7-14-42) permits contractors assigned ratings on PD-3-a certificates by the armed services or other war agencies to use rating within specified limits for operating supplies and to replace materials in inventory.

No. 11...Interpretation No. 2 (7-13-42) permits manufacturers operating under PRP to request suppliers to retain orders on the books for future delivery if such orders are in excess of authorized quarterly purchases.

PERSONALS

• **Ernest S. Jefferies** has been elected president of the Universal Boring Machine Co., Hudson, Mass. Charles A. Clarke has been named vice-president and chairman of the board. Joseph Wiggin and Alson H. Goodsell have been made vice-president and treasurer respectively.

• **C. W. Meyers** has been appointed special representative in the aviation field with the manufacturer's products division of the sales department of American Steel & Wire Co., Cleveland. In his new post Mr. Meyers will handle the company's affairs with aircraft manufacturers and suppliers and will lend his advisory services as regards stainless steel particularly. Mr. Meyers has been assistant manager of the metallurgical department of American Steel & Wire since 1937. For the past four years he had concentrated on metallurgical problems of special steels, and is an expert on such matters in their application to aircraft construction.

• **R. J. Schuler,** for the past five years assistant manager of sales with the Bolt & Nut Division of Republic Steel Corp., Cleveland, has been named general manager, Hampshire Products, Inc., Milan, Mich. Previous to his Republic connection he was general manager of sales of the LaSalle Steel Co., Chicago, for 10 years.

E. S. JEFFERIES, president, Universal Boring Machine Co., Hudson, Mass.

C. W. MEYERS, special representative, American Steel & Wire Co.

• **Ira J. Snader,** division manager of the Republic Aircraft Products Division of the Aviation Corp., Detroit, has been made vice-president of manufacturing. He will be succeeded at Republic by **Sterling B. Withington,** formerly general manager of the Brunswick-Balke-Collender Co., Muskegon, Mich. Mr. Snader became associated with the Aviation Corp. in December, 1940. For eight years before that, he was in charge of standard machine tool design and production at the Ex-Cell-O Corp., Detroit. He was one of the founders and the first treasurer of Ex-Cell-O. He was also assistant chief engineer in charge of tooling at the Wilson Foundry & Machine Co., Pontiac, Mich., and production engineer at Wright Aeronautical Corp., Paterson, N. J.

• **Victor H. Lawrence** has been appointed general superintendent

I. J. SNADER, vice-president, Aviation Corp., Detroit, and S. B. Withington, his successor as division manager, Republic Aircraft Products division of the Aviation Corp.

V. H. LAWRENCE, general superintendent, Otis Work, Jones & Laughlin Steel Corp.

of the Otis works of Jones & Laughlin Steel Corp., at Cleveland. Since 1917, Mr. Lawrence has been engaged in the construction, operation, engineering and metallurgical phases of steel manufacture with several companies. In 1941 he joined the organization of the Otis Steel Co. as assistant to the president.

• **Howard M. Dawson,** formerly of the Detroit office, has been put in charge of the export department, with headquarters in the New York district office, for Jessop Steel Co., Washington, Pa. **Fred Jessop Wood** has taken over Mr. Dawson's former duties at the Detroit branch.

• **William T. Sanford** has been named as service manager of the railroad division of the Buda Co., of Harvey, Ill. Mr. Sanford has served six years with the Hoosick Electric Specialty Co., of Hoosick Falls, N. Y. He has spent two and a half years with the Chrysler Corp., Detroit, as automotive and diesel field engineer; two years with Sinclair Refining Co., Chicago, as field engineer covering the State of Illinois; and three years with Socony-Vacuum Co., Chicago, in the same capacity.

• **Worthing H. Stone** has been appointed assistant advertising manager, in charge of advertising for the railroad, farm implement, automotive and rock bit divisions of the Timken Roller Bearing Co., Canton, Ohio. **S. L. Huffman,** a member of the advertising staff for several years, has been advanced to manager of the news bureau where he will be responsible both for general publicity and technical articles for the industrial press, in addition to continuing his present duties of handling the advertising of the Steel and Tube Division.

• **J. B. Ambler** has been named midwestern district representative of the Pittsburgh Lectrodryer Corp., Pittsburgh. His offices are at 602 Denver National Building, Denver, Colo.

• **Julius A. Berninghaus,** general manager of sales of the organic chemicals division of Monsanto Chemical Co., has been promoted to general manager of the division. He succeeds **John W. Livingston,** who has resigned to become consulting engineer to the Rubber Reserve Company, the federal agency dealing with the provision of facilities for synthetic rubber production.

• **Bruno Loeffler** has been made chief engineer in charge of American Bosch Corp. engineering design, and **W. Chester Robinson** has been named executive assistant to vice-president Edward H. Moll, who is in charge of manufacturing operations.

• **Robert R. Jones** has been appointed personnel director for the Birmingham plant of Rheem Mfg. Co. Mr. Jones formerly was associated with the United States Employment Service in Alabama.

• **John F. Brandt** has been elected president and treasurer of the Anthracite Bridge Co., Scranton, Pa. **William E. Harding** has been named vice-president of the company, and **D. Boulton Musser,** secretary.

• **Joseph A. Elwood** has been appointed general works manager of the George Gorton Machine Co., Racine, Wis. For 19 years, Mr. Elwood had been associated with C. W. Nash of Nash Motors, and was division superintendent in charge of tools and production of the Racine division from its inception. Later he was connected with the Ajax plant of the Walker Mfg. Co. in charge of production. Until recently, he was factory manager of the hydraulic division of the Sundstrand Machine Tool Co., at Rockford, Ill.

• **S. H. Mortensen,** engineer-in-charge of a.c. design for 10 years, has been appointed chief electrical engineer of the Allis-Chalmers Mfg. Co. plants at West Allis, Cincinnati, Boston and Pittsburgh. Starting at the Allis-Chalmers Norwood works in 1905, Mr. Mortensen was transferred to Milwaukee as an electrical draftsman three years later. There he successively became design engineer for d.c. machines, design engineer of rotating synchronous machines, and in 1932 engineer-in-charge of alternating current design.

• **Dan C. Hungerford** has resigned as vice-president and director of the Elastic Stop Nut Corp., Union, N. J. He joined the corporation in 1936 as field engineer and, 18 months later, was made chief engineer. In January, 1940, he was elected to the board of directors and, in July of the same year, was made vice-president in charge of engineering. He was placed in charge of the corporation's sales and advertising activities in 1941.

OBITUARY . . .

• **F. W. (Bill) Jaeger** died of a heart ailment July 18, aged 71 years. Mr. Jaeger had been the United States representative of the German firm of Schuchardt & Schuette from 1903 until the dissolution of the company, when he became the representative of A. H. Schuette & Co. His connection with that concern ceased at the outbreak of the first World War and after that war, he looked after the American interests of August Schmitz, Dusseldorf. He continued to work for August Schmitz until September, 1939, the start of the present conflict, and since that time has been inactive.

• **Otto Zachow,** fifty years ago originator of the four-wheel drive for automobiles and trucks, died July 15. He was 80 years old.

• **Chester A. Horton,** superintendent of production at the Boston Navy Yard, died, aged 48 years. He had been associated with the Navy Yard for 26 years.

• **Perrin G. March,** president of the Cincinnati Shaper Co., died July 18 of a heart attack, aged 55 years. Mr. March was a son of Perrin March, Sr., founder of the shaper company.

• **S. Houghton Cox,** vice-president and director of the Cleveland Twist Drill Co., died in Pasadena, Cal., on July 12. Up until the time of his death, Mr. Cox served actively as a director, although he was not actively engaged in the conduct of the business, which was founded by his father, the late Jacob D. Cox, II, in 1876.

• **Emmett E. Conneely,** manager of railroad sales of Republic Steel Corp., Cleveland, died July 10, aged 58 years. Mr. Conneely started his business career in Pittsburgh in the purchasing department of Pittsburgh & Lake Erie Railroad and later became assistant to Col. J. M. Schoonmaker. Following this, he was with Standard Steel Car Co. in Baltimore and later became vice-president and director of the New York Air Brake Co. In 1925, he was made New York representative of Pullman Co., which position he held until he became vice-president of the Standard Steel Car Co., in Pittsburgh. He entered the Republic organization in 1933.

Material Shortages Limiting Full Output in War Plants

Cleveland

• • • **Reports from machine tool producers** and war contractors indicate that material shortages have overtaken the expansion and training programs of war plants. Since many war contracts had been signed on the basis of mass production setups, it is increasingly apparent that some changes or adjustments in arrangements may have to be made to permit war contractors to cover expenses when operating on a limited production basis.

The Stanley coding system to designate machine tools by certain key letters is expected to be incorporated eventually in the critical tool survey set-up now being made by the War Production Board.

Although the delivery situation has not improved in certain lines such as boring mills, planers and large size lathes, certain other tools are more easily available than they were a few months ago. For example, it is understood that small-size lathe deliveries are now on a four to eight weeks' basis on an A-1-a rating.

The Ohio Injector plant at Wadsworth, Ohio, will build a brick and concrete unit three stories high, 80x84 ft.

Seek Machines for Bullet Cores

Chicago

• • • **An urgent call for subcontractors** capable of turning 0.50 cal. A.P. bullet cores was issued by the local WPB office last week. The agency indicated that facilities in any part of the country would be considered. A prospective subcontractor, WPB said, should have at least two four-spindle automatic screw machines or at least one six-spindle or one eight-spindle automatic, size at least 9/16 in. The 0.50 cal. core is approximately 2 in. long and 3/8 in. in diameter.

The call for 0.50 cal. core contracts is in addition to a recent request for subcontractors for 0.30 cal. cores. Subcontractors for the latter should have at least three No. 00 B & S automatics or three 3/8 in. or larger multiple spindle automatics.

WPB further asked that if any plant had single purpose machines or if attachments had been developed for lathes that might handle 0.30 or 0.50 cal. cores that the plant get in touch with the Chicago WPB office immediately so that arrangements might be made to inspect these machines.

Rudel Takes Over Many of Henry Prentiss & Co. Lines

New York

• • • **The newly formed Rudel Machinery Co., Inc.,** 100 East 42nd Street, New York, has taken over many of the machine tool lines formerly handled by Henry Prentiss & Co. up until the time of the latter's withdrawal from business on June 1. (THE IRON AGE, May 28, p. 92.) The manufacturers now being represented in northern New Jersey, eastern half of New York State and Connecticut by the Rudel concern are the following:

Acme Machine Tool Co., Cincinnati
Avey Drilling Machine Co., Cincinnati
Cincinnati Bickford Machine Tool Co.
Gould & Eberhardt, Irvington, N. J.
Racine Tool & Machine Co., Racine, Wis.
V & O Press Co., Hudson, N. Y.

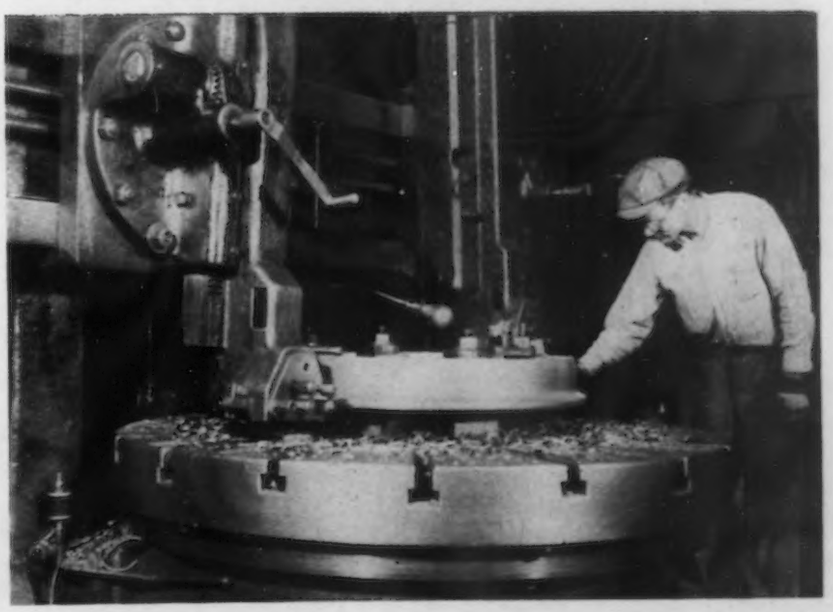
Several other lines are in the process of negotiation.

Rudel Machinery Co. is headed by Thomas R. Rudel, formerly vice-president of Rudel Machinery Co., Ltd., of Montreal, Canada. Mr. Rudel and his family, all American citizens, have been connected with the machine tool business for many years. His father, Clarence M. Rudel, was a salesman for the American Tool Works Co. 45 years ago and the Canadian dealer organization since 1909 and has represented the leading American machine tool builders throughout the Dominion. The senior Rudel at one time was also president of Canadian Vickers, Ltd.

The other members of the new organization were all formerly connected with Henry Prentiss & Co., New York. Walter O. Graham, now vice-president, had been with the Prentiss organization for over 36 years and has served the northern New Jersey territory since 1915. Lewis H. Pratt, another vice-president, had been with the Prentiss firm since 1927, serving the eastern part of New York State. Elbert D. Ackerman, secretary-treasurer, had been in the Prentiss accounting department since 1923. Frank Hamilton, who will handle quotations and orders, had been with the Prentiss organization since 1914, except for an absence during the war.

Other district salesmen are: Robert Granfield (Connecticut) and Richard Taisey (Brooklyn and Long Island).

BUTCHER-MACHINIST: Steve Egels, a butcher until the recent (June 29) reopening of the boring mill of American Locomotive's Chicago Heights plant, is checking a measurement on a carwheel tire for export to one of the United Nations. The entire Chicago Heights plant has been rehabilitated and is turning out steel ingots, tank parts and Navy forgings.



NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

Cases To Be Made Of Steel, Stimson Says

• • • **A changeover from brass** to steel artillery shell cases will be made in the next few months, Secretary of War Stimson said last week. More than 30 manufacturers, among them the American Rolling Mill Co. and Buick Motor Division, are said to be making the new steel cases now. According to Secretary Stimson, ordnance experts consider the new cases as satisfactory as those of brass.

Steel cases have been used by both the Russians and Germans, it is said. The research division of Armco, in cooperation with government and private ordnance organizations, began work on development of a special steel for this purpose early in the war. A manufacturing method which uses the same plant equipment as is used for drawing brass cases has been developed. It is expected that about a million pounds of copper a year will be saved.

Preliminary good results have been obtained in similar experiments just begun with small arms ammunition, Stimson said.

The job of hunting down and directing into war production the estimated 500,000,000 lb. of copper and brass now frozen in idle and excess inventories has been started by the Copper Recovery Corp., which last week compiled its first inventory list of copper available to high priority war producers. The list, which contains more than 2000 different items, was made up from the first 15 days' answers to 100,000 questionnaires sent to holders of copper stocks by CRC.

Under the new plan, inventory lists will be sent frequently to WPB offices and to war producers. Producers who can use items listed will be put in touch with the nearest holders of such stocks, with negotiations left up to the companies concerned.

Items not spoken for 15 days after a list's release will be bought by the CRC at the corporation's salvage prices. Those items which CRC officials feel may still be wanted in their present form will be stored for about 60 days, then, if not sold, scrapped. Other items will be scrapped immediately.

CRC officials hope to have placed all copper stocks in war production work, either as scrap, or as is, within eight months. Originally they estimated that 10 per cent of stocks could be used in their present forms but this estimate, in the light of the first two weeks' questionnaire replies, has been revised to 20 per cent. Another 25 per cent of stocks are said to be in the form of scrap at present. The remaining 65 per cent will probably be scrapped by CRC.

Stocks which their owners refuse to sell, either directly to high priority holders or at a salvage price to the CRC, will be requisitioned. Appeals machinery has been set up, but there can be no appeal on the CRC salvage prices, only on the question of selling or holding. Ernest A. Tupper, chief of the Inventory and Requisitioning Branch of the WPB, estimates that at least 80 per cent of copper stock holders are willing to sell at CRC prices, without any questions.

Any holder of copper or copper-base alloy, who is not engaged in war production and has not received a WPB inventory form, should immediately apply to the nearest WPB field office for copies of Forms 843 A, B and C and file them at once with the Copper Recovery Corp., 200 Madison Avenue, New York.

Higher preference ratings for copper mines in South America, which obtain stipulated amounts of maintenance and operating supplies with the assistance of preference rating order P-58, were announced July 14 by the Director-General for Operations. Operators who have received a serially numbered copy of the order may now apply an A-1-a rating for 25 per cent of the dollar value of the material ordered, A-1-d to 35 per cent and A-3 to the balance. Previous ratings were A-1-d and A-3.

The base period for deliveries is changed to the calendar half year preceding the one in which the rating is applied. An operator may not apply ratings assigned under the order to obtain deliveries of a dollar value exceeding 125 per cent of that for materials shipped to him in the preceding half year. Monthly reports must be filed with the War Production Board showing ratings applied during the preceding month. The order is effective until revoked.

Smelters and refiners of 13 nonferrous metals operating under order P-73 need not file PRP applications for the third quarter of 1942 and will continue to operate under P-73 for that period, the Director-General for Industry Operations announced July 14. P-73 sets up priority ratings for the maintenance and repair needs of 102 smelters and refiners. Many of them are small and do not use the minimum of $5,000 worth of metal in a quarter. Pending completion of a uniform system, P-73 will apply to all smelters and refiners. Metals involved are antimony, cobalt, copper, iridium, lead, mercury, molybdenum, nickel, platinum, tin, tungsten, vanadium and zinc.

Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper Electrolytic[1]	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis[2]	8.25
Lead St. Louis[3]	6.35

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt; Asiatic, nominal, New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

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New Type Plant is Built By Wright Aeronautical

• • • **The Wright Aeronautical Corp.** is constructing, by the "war-speed" process, a new type of concrete building "somewhere in New Jersey," according to an official announcement from the company. The plant is expected to be ready for manufacturing in a short time.

Cyclone aircraft engines in the upper horsepower range will be manufactured in this newest of the New Jersey factories.

Operations Hold Up; Drive Will Give Aid

• • • **Justifiably proud** of their part in helping sustain high steel operations, members of the scrap iron and steel industry this week looked to the new national salvage campaign for certain assistance in improving the general supply picture.

According to a statement issued July 19 by WPB, "the new program recognizes that there is no one best way to collect scrap; that once the people realize the country's vital need, they will get the scrap and get it in the way most suitable to a particular community."

Backbone of the drive, the steel industry's advertising campaign for scrap (see page 86 of this issue), has opened with a send-off from Donald M. Nelson, WPB chief. At the same time the government warned that strenuous efforts are needed to hold the high rate of ingot production.

The campaign probably will cost $2,000,000 and is expected to be aided by much free publicity. Regardless of whether it gets out a remarkable volume of scrap, observers feel the nation will become scrap conscious and that there probably will be many scrap sources in remote areas brought to the attention of authorities.

Germany, too, is having its troubles getting scrap. Hitler last week ordered confiscation of all unused iron and steel in his nation, including finished castings and spare parts, according to a Berlin domestic broadcast caught in this country lase week.

Of course, the campaign there will be enforced by the uniformed police under Heinrich Himmler. If factory managers don't cooperate they will be jailed. Material to be collected, according to the broadcast, includes "in particular old iron, unprocessed iron and steel, half-finished items and finished products stored as spare parts which are now obsolete due to changes in war equipment."

"Compliance will be ensured by the fact that each offense against the natural obligations by the (plant) manager falls under penal stipulations of the order of the Fuehrer of March 21," said the Nazi announcer. "Further active support will be brought about by the uniformed police through special decrees of the S. S."

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OPA Denies Rumors About Baled Turnings Adjustment

• • • **OPA denied** emphatically last week that it was studying a new price for baled turnings, as reported in Chicago scrap circles. It has been decided that the price of compressed turnings will remain at the same price as the lowest grade of a mixture, as defined under Appendix A, subsection A, paragraph H, covering mixed shipments, with the provisions for briquettes which conform to specifications also having bearing on the matter.

Test Drive for Old Cars

Cleveland

• • • **The City of Canton, Ohio,** has been chosen for a test drive to move old jalopies which no longer are useful, back to the automobile graveyards to be scrapped for war production. The drive, which will be made to get owners of old cars to dispose of them to scrap dealers, will be under the supervision of John J. Sheehan, district chief of the automobile graveyard section for northeastern Ohio.

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Removal Bids Accepted

• • • **Boston** closed bids Monday on about 6000 tons of abandoned street car rails. The last two previous contracts it made for scrap rails were at $14.31 a ton in the street, and $15.05 a ton from storage.

More Scrap News on Next Page

EVERYBODY'S HAPPY: Housecleaning is a pleasure at Lockheed-Vega. These girls are sorting usable aircraft parts from the 87 tons of scrap collected by the aircraft companies in a one-week drive. About 35 per cent of the pile of salvaged material could be returned to current plane production.

Removal of Steel Rails Will Release Scrap Tonnages

St. Louis

• • • **The Terminal Railroad** of St. Louis will remove 250 tons of steel rails from the highway deck of its Eads Bridge across the Mississippi River, which will be used in its tracks, thus relieving a like amount of scrap steel for the war effort. A total of 500 tons of steel rails is imbedded in concrete in the vehicular deck of the MacArthur Bridge owned by the city, and therefore its removal is regarded as impractical.

Story of an American, or Why U. S. Will Win the War

• • • **Few people saw** the small item in the Pittsburgh daily papers recently, reporting the death of David Burke of McKeesport, a "junk dealer," but the Pittsburgh Office of War Information recalled that he had gone to Washington early in the war effort to interest the Government in getting out farm scrap.

"His idea was quickly accepted by the WPB," reported the War Information Office. "Field men in the WPB were ordered to check farms for scrap. But David Burke did even more. He got out his truck and made the rounds of the farms. . . . He was fighting with all his heart which gave out under heavy strain long before its time. . . . That's the story of David Burke who died for his country fighting for it on the home front."

District Markets

BUFFALO — Supplies continue ample for current operations at all local plants, but the fact remains the steel mills are not gathering sufficient reserve supplies to assure present capacity operations during the coming fall and winter months. The district's largest consumer now has about 35,000 tons in its reserve stockpile whereas in former years close to 100,000 tons was accumulated by this time. This is interesting in view of the fact that, according to leading scrapmen, collections of scrap metal in the area in the last two to three months actually have shattered all previous records by an appreciable margin.

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CLEVELAND — Dealers are complaining that rejections are on the basis of flimsy excuses concerning quality, whereas actually the rejections are blamed upon the decision of mills to avoid using certain types of scrap after contracts and arrangements have been made for such deliveries. In the Youngstown area Carnegie-Illinois Steel Corp. has joined the ranks of steel companies now mining slag dumps. The company has awarded mining contracts for its dumps at McDonald and Farrell and material recovered at both places will be made available to the respective open hearths.

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BOSTON—Many dealers have about all the scrap on hand they can handle with available labor. Rather than soliciting business, they are becoming choosy. Apparently New England steel mills are comparatively better off than Pennsylvania because rail scrap originally allocated to New England is reported to have been reallocated to Pennsylvania. Movement of auto scrap from graveyards has been fairly heavy of late.

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CINCINNATI — Dealers are looking upon the salvage drive with some skepticism, but with a great deal of hope that it will bring out old materials which heretofore had not been considered scrap. While there has yet been no dislocation, dealers indicate that the current flow of old materials is just about keeping pace with the consumption.

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BIRMINGHAM—The scrap situation in this area has yet to satisfy government authorities. Auto graveyard operators are reported to be cleaning up their yards fairly well but not to the extent necessary.

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CHICAGO—The supply situation here continues to move sidewise. The general mill position shows neither gain nor loss, with the movement just sufficient to support current operations. Mills are unable to do any stocking for winter use.

•

PITTSBURGH — The movement continues at a fair rate but only one of the smaller sized mills in this district has accumulated a comfortable inventory. As a rule, other mills do not have as much as a 30-day inventory on hand. Foundries continue better situated so far as cast grades are concerned. Dealers with representatives working through farming areas report that farmers apparently are holding onto their scrap for possible higher prices.

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ST. LOUIS—With farmers at work in the fields and the heat affecting handling, receipts of scrap in this market are experiencing the usual July slump. Much is expected from the campaign which opened today. Mill consumption of scrap exceeds daily receipts and reserves are being used. Piles equal three to six weeks' supply. Operations continue at the high rate.

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PHILADELPHIA — WPB reports 52,575-ton graveyard collection for June, a 31 per cent increase over May, in this region. Regional Director Orville H. Bullitt is asking jalopy owners to sell their cars at their scrap value instead of the former scrap-plus-spare-parts price.

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Record Time Achieved in Relining T. C. I. Furnace

Birmingham

• • • **Record time** in bricklaying in a blast furnace has been made in the relining of the No. 3 Ensley Blast Furnace of Tennessee Coal, Iron & Railroad Co. This furnace was blown out for relining above the mantel at 8:55 a.m. on June 10. Relining started at 7 a.m. on June 22. At 7 a.m. on July 1 the job was completed, consuming 24 8-hour turns.

CAFE SOCIETY SCRAP: Swank Park Avenue comes across with its scrap rubber and metal. Although the receptacles are a bit gaudy, the idea of getting the scrap is the same here as throughout the country. These red, white, and blue barrels were outside of 70 Park Avenue at 38th Street.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shovelling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES: Low Phos. Billet, Bloom, Forge Crops	Low Phos. Bar Crops, Punchings, Plate Scrap and Cast Steel	Low Phos. Tube Scrap	Heavy Structural and Plate 3 ft. and Under	Heavy Structural and Plate 2 ft. and Under	Heavy Structural and Plate 1 ft. and Under	Cut Auto. Steel Scrap 3 ft. and Under	Cut Auto. Steel Scrap 2 ft. and Under	Cut Auto. Steel Scrap 1 ft. and Under and Auto. Springs, and Crankshafts	Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$23.00	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	19.75	14.75	14.75	23.75	21.25	21.75	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	22.25	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	21.25	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	19.00	14.00	14.00	23.00	20.50	21.00	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.85	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio		13.85	13.85												
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.50	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.00
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	20.00	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minneapolis, Colo.	16.50	12.50	12.50	21.50	19.00	19.50	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.00
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.50	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.00

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, Conshohocken, 36c.; Atlanta, Birmingham, Pittsburg, Cal., 32c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 43c.; Alabama City, 26c.; Minneapa, 22c.; Seattle, 53c. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 50c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.05 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$22.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	18.00	19.00	20.50	21.00	21.25	21.50
Detroit	20.25	21.25	22.75	23.25	23.50	23.75
Duluth	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.	17.00	18.00	19.50	20.00	20.25	20.50
Seattle	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis	16.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	16.50	18.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A: Includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B: Includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices . . .

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*. Prices Are F.O.B. Major Basing Points)

	July 21, 1942	July 14, 1942	June 23, 1942	July 22, 1941
Flat Rolled Steel: (Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 123 to 130 herein.

	July 21, 1942	July 14, 1942	June 23, 1942	July 22, 1941
Pig Iron: (Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. Charcoal, Chicago.	31.34	31.34	31.34	31.34
Ferromanganese ‡	135.00	135.00	135.00	120.00
Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	53.75
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 21, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	LOW
1942	2.30467c.,	2.30467c.,
1941	2.30467c.,	2.30467c.,
1940	2.30467c., Jan. 2	2.24107c., Apr. 16
1939	2.35367c., Jan. 3	2.26689c., May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18
1937	2.58414c., Mar. 9	2.32263c., Jan. 4
1936	2.32263c., Dec. 28	2.05200c., Mar. 10
1935	2.07642c., Oct. 1	2.06492c., Jan. 8
1934	2.15367c., Apr. 24	1.95757c., Jan. 2
1933	1.95578c., Oct. 3	1.75836c., May 2
1932	1.89196c., July 5	1.83901c., Mar. 1
1931	1.99629c., Jan. 13	1.86786c., Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

	HIGH	LOW
1942	$23.61	$23.61
1941	$23.61, Mar. 20	$23.45, Jan. 2
1940	23.45, Dec. 23	22.61, Jan. 2
1939	22.61, Sept. 19	20.61, Sept. 12
1938	23.25, June 21	19.61, July 6
1937	23.25, Mar. 9	20.25, Feb. 16
1936	19.74, Nov. 24	18.73, Aug. 11
1935	18.84, Nov. 5	17.83, May 14
1934	17.90, May 1	16.90, Jan. 27
1933	16.90, Dec. 5	13.56, Jan. 3
1932	14.81, Jan. 5	13.56, Dec. 6
1931	15.90, Jan. 6	14.79, Dec. 15
1930	18.21, Jan. 7	15.90, Dec. 16
1929	18.71 May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	HIGH	LOW
1942	$19.17	$19.17
1941	$22.00, Jan. 7	$19.17, Apr. 10
1940	21.83, Dec. 30	16.04, Apr. 9
1939	22.50, Oct. 3	14.08, May 16
1938	15.00, Nov. 22	11.00, June 7
1937	21.92, Mar. 30	12.92, Nov. 10
1936	17.75, Dec. 21	12.67, June 9
1935	13.42, Dec. 10	10.33, Apr. 29
1934	13.00, Mar. 13	9.50, Sept. 25
1933	12.25, Aug. 8	6.75, Jan. 3
1932	8.50, Jan. 12	6.43, July 5
1931	11.33, Jan. 6	8.50, Dec. 29
1930	15.00, Feb. 18	11.25, Dec. 9
1929	17.58, Jan. 29	14.08, Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢[14]			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢(11)		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	$54.00

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.53*	*$25.03*	*$26.53*	*$26.03*	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27 62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	*$31.34*
Chicago	24.00	23.50	24.50	24.00	.....	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	$28.00
Lake Superior fc	.....	.....	.....	.....	.....	33.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	.....
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

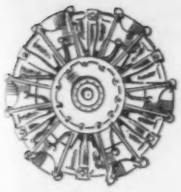
Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35	.....	.....	.10/.20	.....	.45c	$ 9.00	.95c	$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35	.....	.....	.25/.35	.....	.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35	.....	.....	.20/.30	.....	.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.40/.60	.....	1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.



WANTED

50 PRODUCTION EXECUTIVES

Must be top-flight men of proven ability, capable of directing the many divisional operations of one of the world's largest aircraft-engine plants.

The Dodge Chicago Plant, division of Chrysler Corporation, now being built in the Chicago area, wishes to have associated with it a large group of men who have demonstrated their specialized talent, executive ability and high character.

The contract held by Chrysler Corporation for the production of aircraft engines is an outstanding commitment in the war program. It requires doing another high-precision job on a mass-production basis.

This gigantic plant will be one of the world's largest under one roof. Machine tools, equipment and facilities will be the finest and most modern. The personnel must measure up to the same high level of individual efficiency.

This war project demands executive supervision of men, materials and machinery on a scale heretofore unknown in industry. The Dodge Chicago Plant, division of Chrysler Corporation, is determined, therefore, to select as executives men who can guarantee the performance required by patriotic necessity and exacting manufacturing standards.

The Production Executives chosen for this painstaking task must be experts, backed by years of proven skill—both technical and managerial. Thousands of able Americans will work under their direction in round-the-clock shifts. Thousands of precision instruments and production tools will be the responsibility of these top men. That is why they all must be exceptionally good!

EXECUTIVES WANTED FOR THE FOLLOWING DIVISIONS—

ALUMINUM FOUNDRY
MAGNESIUM FOUNDRY
FORGE
HEAT TREATING & PLATING

MACHINE SHOP:
Crankcase · Crankshaft
Connecting Rod & Piston
Cylinder Head & Barrel Assembly
Gear Cutting · Precision Parts

ASSEMBLY & RE-ASSEMBLY
INSPECTION
WORKS ENGINEERING
MASTER MECHANICS

NOTE: *Here is an unusual opportunity for men who are eager to become affiliated with a large organization engaged in the production of vital war materials. Give age, qualifications and salary expected. Proof of citizenship required. All correspondence will be kept confidential. Appointments will be made for personal interviews at your convenience. Address your application to Box V-199, care of this paper.*

DODGE CHICAGO PLANT

Division of CHRYSLER CORPORATION

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent off List
Machine and Carriage Bolts:	
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65
Nuts, Cold Punched or Hot Pressed:	
(Hexagon or Square)	
½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*

	Base per 100 lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets *(7/16 in. and smaller)*

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws

	Per Cent Off List
Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	....	$4.65	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05[5]	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.68[6]	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45[3]	....	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.48	....	....	....	....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	....	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati	3.42	4.37[2]	4.42[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	....	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington	3.60	....	....	4.10	....	3.80	3.80	3.95	4.10	....	....	....	....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	....	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis	3.85	....	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	4.05	....	....	4.30	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	4.00	....	....	4.30	....	4.05	4.05	3.75	....	....	....	....	....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†	4.55	7.05	6.10	4.50	....	4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle†	4.65[7]	....	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	3.00	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

ZINC IN WAR

Zinc Coated Steel Cables for Barrage Balloons

ADEQUATE GALVANIZING REQUIRED

The standard for U. S. Army and Navy purchases is *the best available*—and that is as it should be. Not only do our fighting forces deserve the best in performance, but quality insures obtaining full value for every war dollar. Typical of this economy are those war applications of iron and steel which involve corrosion problems. In such cases, *adequate* galvanizing (zinc coating) is required—because scant galvanizing wastes zinc, time and money.

The U. S. Bureau of Standards (Circular 80) states that zinc is "by far the best" protective metallic coating for the rust-proofing of iron and steel. Because zinc is above iron in the electromotive series, corrosion will attack zinc first, thereby protecting the iron from rust. Even though iron or steel is exposed in small areas such as at cut edges, in a protective coating, it is not corroded—if that coating is zinc.

Galvanizing serves the war program in many ways. Illustrated above and below are the all-important *galvanized steel cables on a barrage balloon*, and a few other typical examples of war galvanizing are shown in the background of this page: (1) portable steel landing field, (2) corrugated iron bomb shelter, (3) merchant marine wire rope hoist, (4) wire netting for camouflage. Not illustrated is the all-important zinc-coated pipe on ships.

It is the job of the zinc industry to see that sufficient zinc is available to provide *adequate* galvanized coatings for all-important war applications. This is a major reason why civilian users of metal and pigment may not be able to obtain all of the zinc they would like to have.

THE NEW JERSEY ZINC COMPANY

MANUFACTURERS OF THE FAMOUS HORSE HEAD ZINC PRODUCTS

10 GALVANIZING

1 HULL PLATES

2 RUBBER

3 PAINT

4 BRASS

5 CERAMICS

6 DIE CASTING

7 PHARMACEUTICALS

8 METAL SPRAYING

9 STAMPING DIES

FOR VICTORY

BUY UNITED STATES WAR SAVINGS BONDS STAMPS

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	60-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$36.00
Domestic, 26 to 28%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.60
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon	$113.00*
2.50 carbon	118.00*
2 carbon	123.00*
1 carbon	133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo., f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FLUORSPAR

Fire Clay Brick	*Per Net Ton*
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00
Foreign, 85% calcium fluoride, not over 5% Ci, c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$34.00
As above, in bags, f.o.b. same mines	36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania	$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester	$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester Pa.	54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Foreign Ores**

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

	Per Unit
African, 46-48 Mn	70c.-75c.
Indian, 48-50 Mn	75c.
Brazilian, 46-48 Mn	81c. to 83c.
Cuban, 51 Mn	85c.
	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$24 to $26
Tungsten, domestic scheelite, at mine	$24 to $25
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)	$28 to $30
Rhodesian, 45	Nom.
Rhodesian, 48	Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

	Per Net Ton
†Connellsville, prompt	$6.00

Foundry

†Connellsville, prompt .... $6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

FUEL OIL

No. 6 Bur. Stsd., del'd Chicago	4.75
No. 3 distillate del'd Cleveland	6.50
No. 4 indus., del'd Cleveland	6.00
No. 5 indus., del'd Cleveland	5.25
No. 6 indus., del'd Cleveland	5.25

This Week's Priorities and Prices

Bicycle production order L-52 was amended permitting the manufacture of about 100,000 vehicles between July 1 and Aug. 31. (WPB-1542)

Copper wire in spools may be obtained by a temporary procedure set up for wholesalers and resale for automobile repair. (WPB-1548)

Wholesalers and distributors are exempted from inventory restrictions of order L-63 by exemption No. 7, issued July 16. (WPB-T585)

Builders with project ratings under order P-19, serial numbers above 81, are restricted in use of ratings by amendment No. 1 to order, issued July 16. (WPB-T586)

Lithium compounds are placed under allocation starting Sept. 1 by order M-191, issued July 16. (WPB-T590)

Machine tool builders by amendment 12 effective July 21, may enter into contracts and make deliveries at prices above the ceilings of schedule 67 while awaiting formal rulings from OPA on the petitions they must file when seeking increased prices. (OPA-289)

Non-ferrous scrap transport charges procedure in determining has been simplified when delivered from the point of shipment to the purchaser in the sellers' own conveyance. (OPA-291)

Copper alloy scrap prices, 13 classifications, were reduced by amendment No. 1 to amended schedule No. 20, issued July 17. (OPA-292)

Maximum price exceptions have been granted to four specified bituminous coal mine operations because of clear showing that increasing costs have affected operations. (OPA-311)

Tin and terne plate in process on May 16 and certain products in inventory may be used for repairs regardless of ratings and on defense housing projects by amended order M-21-e, issued July 11. (WPB-T569)

South American copper mines have been granted higher preference ratings by an amendment to order P-58, issued July 14. (WPB-1532)

■ ■ ■

For copies of above announcements address Division of Information, WPB (or OPA), Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 *means announcement* 600 *issued by the War Production Board.)*

Revisions to The Iron Age Priorities Guide

● ● ● The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of June 4 to bring the Guide up to date.

Under "M Orders," page 6, add:

M-9-c...Amendment No. 3 (7-10-42) adds a "military exemptions list" to the order to permit manufacture of binoculars and valves for ship use after Aug. 1.

M-21-e...Amended order permits use of tin and terne plate in process and specified products in inventory on May 16 to be used for repair and defense housing, regardless of rating (7-11-42).

M-63-a...Amended order includes shipment by inland waterway in classification of order that may move without restriction if shipped overland or by air from Canada or Mexico (7-15-42).

M-112...Amended order eases restrictions on use of antimony to encourage substitute for tin (7-11-42).

M-150...Amendment No. 1 (7-11-42) controls xylol and xylol range aromatic materials made from coal tar as well as the petroleum derivatives (7-11-42).

M-184...Controls distribution of aniline (7-13-42). Related forms: PD-583 and PD-584.

M-191...Places lithium compounds under complete allocation control effective Sept. 1 (7-17-42). Related forms: PD-585 and PD-586.

Under "P Orders," page 13, add:

P-19...Amendment No. 1 (7-16-42) restricts builders with project ratings under order and serial numbers above 81 in the use of ratings (7-16-42).

P-58...Amended order grants higher ratings for South American copper mines; changes base period on which deliveries are based; and makes order effective until revoked (7-14-42).

P-73...Amended order exempts smelters and refiners of 13 specified non-ferrous metals from filing 3rd quarter PRP applications (7-14-42).

Under "L Orders," page 19, add:

L-23-b...Amendment No. 1 (7-16-42) permits sale of electric ranges to public upon certification as to need.

L-26...Amended order regulates farm equipment production and brings into order the four amendments thus far made to it (7-14-42).

L-29...Amendment No. 2 (7-15-42) provides for disposal of frozen iron and steel inventories by metal sign manufacturers.

L-39...Amended order imposes further restrictions on the manufacture of fire protective equipment (7-11-42).

L-42...Interpretation of Schedule IV permits sale of standard, medium, and extra heavy cast iron soil pipe in stock June 1 (7-13-42).

L-52...Amendment No. 1 (7-17-42) permits manufacture of specified number of Victory model bicycles between July 1 and Aug. 13, 1942.

L-59...Amendment No. 2 (7-11-42) cuts metal plastering bases and accessories production during the four months beginning July 1 to 9250 tons, and sets quotas for manufacturers.

L-62...Amendment No. 3 (7-11-42 permits assembly of venetian blinds until next September from fabricated metal parts on hand as of March 20, 1942, providing parts do not contain more than 2 per cent aluminum, and blinds contain less than 15 oz. of metal.

L-63...Exemption No. 7 (7-16-42) exempts wholesalers and distributors in U. S. territories and possessions from inventory restrictions of order.

L-89...Controls manufacture of elevators and parts (7-9-42).

L-92...Interpretation No. 1 (7-17-42) states order does not apply to lures, baits, or flies if no critical materials are used.

Under "Priority Regulations," page 33, add:

No. 1...Amended regulation delegates powers of WPB Chairman to newly created office of Director General for Operations (7-14-42).

No. 3...Interpretation No. 1 (7-14-42) permits contractors assigned ratings on PD-3-a certificates by the armed services or other war agencies to use rating within specified limits for operating supplies and to replace materials in inventory.

No. 11...Interpretation No. 2 (7-13-42) permits manufacturers operating under PRP to request suppliers to retain orders on the books for future delivery if such orders are in excess of authorized quarterly purchases.

SCRAP

. . . MARKET ACTIVITIES AND QUOTATION TRENDS

Operations Hold Up; Drive Will Give Aid

• • • **Justifiably proud** of their part in helping sustain high steel operations, members of the scrap iron and steel industry this week looked to the new national salvage campaign for certain assistance in improving the general supply picture.

According to a statement issued July 19 by WPB, "the new program recognizes that there is no one best way to collect scrap; that once the people realize the country's vital need, they will get the scrap and get it in the way most suitable to a particular community."

Backbone of the drive, the steel industry's advertising campaign for scrap (see page 86 of this issue), has opened with a send-off from Donald M. Nelson, WPB chief. At the same time the government warned that strenuous efforts are needed to hold the high rate of ingot production.

The campaign probably will cost $2,000,000 and is expected to be aided by much free publicity. Regardless of whether it gets out a remarkable volume of scrap, observers feel the nation will become scrap conscious and that there probably will be many scrap sources in remote areas brought to the attention of authorities.

Germany, too, is having its troubles getting scrap. Hitler last week ordered confiscation of all unused iron and steel in his nation, including finished castings and spare parts, according to a Berlin domestic broadcast caught in this country lase week.

Of course, the campaign there will be enforced by the uniformed police under Heinrich Himmler. If factory managers don't cooperate they will be jailed. Material to be collected, according to the broadcast, includes "in particular old iron, unprocessed iron and steel, half-finished items and finished products stored as spare parts which are now obsolete due to changes in war equipment."

"Compliance will be ensured by the fact that each offense against the natural obligations by the (plant) manager falls under penal stipulations of the order of the Fuehrer of March 21," said the Nazi announcer. "Further active support will be brought about by the uniformed police through special decrees of the S. S."

•

OPA Denies Rumors About Baled Turnings Adjustment

• • • **OPA denied** emphatically last week that it was studying a new price for baled turnings, as reported in Chicago scrap circles. It has been decided that the price of compressed turnings will remain at the same price as the lowest grade of a mixture, as defined under Appendix A, subsection A, paragraph H, covering mixed shipments, with the provisions for briquettes which conform to specifications also having bearing on the matter.

Test Drive for Old Cars

Cleveland

• • • **The City of Canton, Ohio,** has been chosen for a test drive to move old jalopies which no longer are useful, back to the automobile graveyards to be scrapped for war production. The drive, which will be made to get owners of old cars to dispose of them to scrap dealers, will be under the supervision of John J. Sheehan, district chief of the automobile graveyard section for northeastern Ohio.

•

Removal Bids Accepted

• • • **Boston** closed bids Monday on about 6000 tons of abandoned street car rails. The last two previous contracts it made for scrap rails were at $14.31 a ton in the street, and $15.05 a ton from storage.

More Scrap News on Next Page

EVERYBODY'S HAPPY: Housecleaning is a pleasure at Lockheed-Vega. These girls are sorting usable aircraft parts from the 87 tons of scrap collected by the aircraft companies in a one-week drive. About 35 per cent of the pile of salvaged material could be returned to current plane production.

Removal of Steel Rails Will Release Scrap Tonnages

St. Louis

• • • **The Terminal Railroad** of St. Louis will remove 250 tons of steel rails from the highway deck of its Eads Bridge across the Mississippi River, which will be used in its tracks, thus relieving a like amount of scrap steel for the war effort. A total of 500 tons of steel rails is imbedded in concrete in the vehicular deck of the MacArthur Bridge owned by the city, and therefore its removal is regarded as impractical.

Story of an American, or Why U. S. Will Win the War

• • • **Few people saw** the small item in the Pittsburgh daily papers recently, reporting the death of David Burke of McKeesport, a "junk dealer," but the Pittsburgh Office of War Information recalled that he had gone to Washington early in the war effort to interest the Government in getting out farm scrap.

"His idea was quickly accepted by the WPB," reported the War Information Office. "Field men in the WPB were ordered to check farms for scrap. But David Burke did even more. He got out his truck and made the rounds of the farms. . . . He was fighting with all his heart which gave out under heavy strain long before its time. . . . That's the story of David Burke who died for his country fighting for it on the home front."

District Markets

BUFFALO — Supplies continue ample for current operations at all local plants, but the fact remains the steel mills are not gathering sufficient reserve supplies to assure present capacity operations during the coming fall and winter months. The district's largest consumer now has about 35,000 tons in its reserve stockpile whereas in former years close to 100,000 tons was accumulated by this time. This is interesting in view of the fact that, according to leading scrapmen, collections of scrap metal in the area in the last two to three months actually have shattered all previous records by an appreciable margin.

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CLEVELAND — Dealers are complaining that rejections are on the basis of flimsy excuses concerning quality, whereas actually the rejections are blamed upon the decision of mills to avoid using certain types of scrap after contracts and arrangements have been made for such deliveries. In the Youngstown area Carnegie-Illinois Steel Corp. has joined the ranks of steel companies now mining slag dumps. The company has awarded mining contracts for its dumps at McDonald and Farrell and material recovered at both places will be made available to the respective open hearths.

•

BOSTON—Many dealers have about all the scrap on hand they can handle with available labor. Rather than soliciting business, they are becoming choosy. Apparently New England steel mills are comparatively better off than Pennsylvania because rail scrap originally allocated to New England is reported to have been reallocated to Pennsylvania. Movement of auto scrap from graveyards has been fairly heavy of late.

•

CINCINNATI — Dealers are looking upon the salvage drive with some skepticism, but with a great deal of hope that it will bring out old materials which heretofore had not been considered scrap. While there has yet been no dislocation, dealers indicate that the current flow of old materials is just about keeping pace with the consumption.

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BIRMINGHAM—The scrap situation in this area has yet to satisfy government authorities. Auto graveyard operators are reported to be cleaning up their yards fairly well but not to the extent necessary.

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CHICAGO—The supply situation here continues to move sidewise. The general mill position shows neither gain nor loss, with the movement just sufficient to support current operations. Mills are unable to do any stocking for winter use.

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PITTSBURGH — The movement continues at a fair rate but only one of the smaller sized mills in this district has accumulated a comfortable inventory. As a rule, other mills do not have as much as a 30-day inventory on hand. Foundries continue better situated so far as cast grades are concerned. Dealers with representatives working through farming areas report that farmers apparently are holding onto their scrap for possible higher prices.

•

ST. LOUIS—With farmers at work in the fields and the heat affecting handling, receipts of scrap in this market are experiencing the usual July slump. Much is expected from the campaign which opened today. Mill consumption of scrap exceeds daily receipts and reserves are being used. Piles equal three to six weeks' supply. Operations continue at the high rate.

•

PHILADELPHIA — WPB reports 52,575-ton graveyard collection for June, a 31 per cent increase over May, in this region. Regional Director Orville H. Bullitt is asking jalopy owners to sell their cars at their scrap value instead of the former scrap-plus-spare-parts price.

•

Record Time Achieved in Relining T. C. I. Furnace

Birmingham

• • • **Record time** in bricklaying in a blast furnace has been made in the relining of the No. 3 Ensley Blast Furnace of Tennessee Coal, Iron & Railroad Co. This furnace was blown out for relining above the mantel at 8:55 a.m. on June 10. Relining started at 7 a.m. on June 22. At 7 a.m. on July 1 the job was completed, consuming 24 8-hour turns.

CAFE SOCIETY SCRAP: Swank Park Avenue comes across with its scrap rubber and metal. Although the receptacles are a bit gaudy, the idea of getting the scrap is the same here as throughout the country. These red, white, and blue barrels were outside of 70 Park Avenue at 38th Street.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES (No. 1 Heavy Melting; No. 1 Hydr. Compressed Black Sheets; No. 2 Heavy Melting; Dealers' No. 1 Bundles; Dealers' No. 2 Bundles; No. 1 Busheling)	BASIC OPEN HEARTH GRADES Machine Shop Turnings	BLAST FURNACE GRADES (Mixed Borings and Turnings; Shoveling Turnings; No. 2 Busheling; Cast Iron Borings)	ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES — Low Phos.			Heavy Structural and Plate			Cut Auto. Steel Scrap					
				Billet, Bloom, Forge Crops	Bar Crops, Punchings, Plate Scrap and Cast Steel	Tube Scrap	3 ft. and Under	2 ft. and Under	1 ft. and Under	3 ft. and Under	2 ft. and Under	1 ft. and Under and Auto, Springs, and Crankshafts	Alloy free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$16.00	$16.00	$25.00	$22.50	$23.00	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Pt.	18.75	14.75	14.75	23.75	21.25	21.75	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	15.50	15.50	24.50	22.00	22.50	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	15.25	15.25	24.25	21.75	22.25	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	14.25	14.25	23.25	20.75	21.25	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	14.00	14.00	23.00	20.50	21.00	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	13.85	13.85	22.85	20.35	20.85	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	13.50	13.50	22.50	20.00	20.50	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	13.00	13.00	22.00	19.50	20.00	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	19.50	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	10.50	10.50	19.50	17.00	17.50	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, Conshohocken, 36c.; Atlanta, Birmingham, Pittsburg, Cal., 32c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, cut auto scrap and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport. Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. Dock charge is 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $2.50 less than the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order).

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh, Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington, Birmingham, Los Angeles, San Francisco	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	18.00	19.00	20.50	21.00	21.25	21.50
Detroit	20.25	21.25	22.75	23.25	23.50	23.75
Duluth	18.85	19.85	21.35	21.85	22.10	22.35
Kansas City, Mo.	19.00	20.00	21.50	22.00	22.25	22.50
Kokomo, Ind.	17.00	18.00	19.50	20.00	20.25	20.50
Seattle	19.25	20.25	21.75	22.25	22.50	22.75
St. Louis	15.50	16.50	18.00	18.50	18.75	19.00
	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
No. 1 machinery cast, drop broken, 150 lbs. and under	18.00	19.00	20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	17.50	18.50	19.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging box size cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switch district of Kansas City, Kan., Mo.

Comparison of Prices . . .

(Advances Over Past Week in **Heavy Type;** Declines in *Italics.* Prices Are F.O.B. Major Basing Points)

Flat Rolled Steel: (Cents Per Lb.)	July 21, 1942	July 14, 1942	June 23, 1942	July 22, 1941
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 123 to 130 herein.

Pig Iron: (Per Gross Ton)	July 21, 1942	July 14, 1942	June 23, 1942	July 22, 1941
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. Charcoal, Chicago.	31.34	31.34	31.34	31.34
Ferromanganese ‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	22.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	24.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.125
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	53.75
Zinc, East St. Louis	8.25	8.25	8.25	7.25
Lead, St. Louis	6.35	6.35	6.35	5.70
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 21, 1942	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1942	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71 May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester =3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester =3.35¢)					3.07¢	3.33¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
BLACK PLATE															
29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[13]			3.39¢
TERNES, M'FG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth =2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢[14]			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[14]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit =2.70¢)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massilon, Canton =2.70¢					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
PLATES								(Coatesville and Claymont =2.10¢)							
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville =3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem =2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester =3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester =4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester =6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester =8.55¢)								
WIRE[9]															
Bright[15]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester =2.70¢)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester =3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢
IRON BARS[12]															
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Common iron bars quoted at 2.15c. by Terre Haute, Ind. producer. [13] Boxed. [14] Portland and Seattle price, San Francisco price is 2.50c. [15] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(*No. 5 to 9/32 in.*)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton	$54.00

TOOL STEEL

(*F.o.b. Pittsburgh, Bethlehem, Syracuse*)

	Base per Lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(*Per lb. base price, f.o.b. Pittsburgh*)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	***$25.53***	***$25.03***	***$26.53***	***$26.03***	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27.62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	*$31.34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

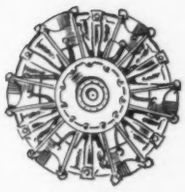
Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

NATIONAL EMERGENCY STEELS (Hot Rolled)

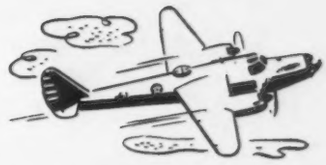
Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT									Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Nickel	Chromium	Molybdenum	Vanadium	Bars & Bar-Strip	Billets, Blooms, & Slabs	Bars & Bar-Strip	Billets, Blooms, & Slabs
NE 8024	.22/.28	1.00/1.30	.040	.040	.20/.35	.....	.....	.10/.20	.....	.45c	$ 9.00	.95c	$19.00
NE 8124	.22/.28	1.30/1.60	.040	.040	.20/.35	.....	.....	.25/.35	.....	.85	17.00	1.35	27.00
NE 8233	.30/.36	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8245	.42/.49	1.30/1.60	.040	.040	.20/.35	.....	.....	.10/.20	.....	.65	13.00	1.15	23.00
NE 8339	.35/.42	1.30/1.60	.040	.040	.20/.35	.....	.....	.20/.30	.....	.75	15.00	1.25	25.00
NE 8442	.38/.45	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8447	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.30/.40	.....	.90	18.00	1.40	28.00
NE 8547	.43/.50	1.30/1.60	.040	.040	.20/.35	.....	.....	.40/.60	.....	1.25	25.00	1.75	35.00
NE 8620	.18/.23	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8630	.27/.33	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.15/.25	.....	.75	15.00	1.25	25.00
NE 8724	.22/.28	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8739	.35/.42	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8744	.40/.47	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8749	.45/.52	.75/1.00	.040	.040	.20/.35	.40/.60	.40/.60	.20/.30	.....	.80	16.00	1.30	26.00
NE 8817	.15/.20	.70/.95	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	.90	18.00	1.40	28.00
NE 8949	.45/.52	1.00/1.30	.040	.040	.20/.35	.40/.60	.40/.60	.30/.40	.....	1.20	24.00	1.70	34.00

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.



WANTED



50 PRODUCTION EXECUTIVES

Must be top-flight men of proven ability, capable of directing the many divisional operations of one of the world's largest aircraft-engine plants.

The Dodge Chicago Plant, division of Chrysler Corporation, now being built in the Chicago area, wishes to have associated with it a large group of men who have demonstrated their specialized talent, executive ability and high character.

The contract held by Chrysler Corporation for the production of aircraft engines is an outstanding commitment in the war program. It requires doing another high-precision job on a mass-production basis.

This gigantic plant will be one of the world's largest under one roof. Machine tools, equipment and facilities will be the finest and most modern. The personnel must measure up to the same high level of individual efficiency.

This war project demands executive supervision of men, materials and machinery on a scale heretofore unknown in industry. The Dodge Chicago Plant, division of Chrysler Corporation, is determined, therefore, to select as executives men who can guarantee the performance required by patriotic necessity and exacting manufacturing standards.

The Production Executives chosen for this painstaking task must be experts, backed by years of proven skill—both technical and managerial. Thousands of able Americans will work under their direction in round-the-clock shifts. Thousands of precision instruments and production tools will be the responsibility of these top men. That is why they all must be exceptionally good!

EXECUTIVES WANTED FOR THE FOLLOWING DIVISIONS—

ALUMINUM FOUNDRY
MAGNESIUM FOUNDRY
FORGE
HEAT TREATING & PLATING

MACHINE SHOP:
Crankcase · Crankshaft
Connecting Rod & Piston
Cylinder Head & Barrel Assembly
Gear Cutting · Precision Parts

ASSEMBLY & RE-ASSEMBLY
INSPECTION
WORKS ENGINEERING
MASTER MECHANICS

NOTE: *Here is an unusual opportunity for men who are eager to become affiliated with a large organization engaged in the production of vital war materials. Give age, qualifications and salary expected. Proof of citizenship required. All correspondence will be kept confidential. Appointments will be made for personal interviews at your convenience. Address your application to Box V-199, care of this paper.*

DODGE CHICAGO PLANT

Division of CHRYSLER CORPORATION

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent off List

Machine and Carriage Bolts:

½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets *(½ in. and larger)*

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets *(7/16 in. and smaller)*

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws *Per Cent Off List*

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	....	$4.65	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.05[5]	4.65	3.51	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.16
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.68*	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.75	6.05	8.88	7.23
Birmingham	3.45[3]	....	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.48	....	....	....	....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	....	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati	3.42	4.37[2]	4.42[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	....	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington	3.60	....	....	4.10	....	3.80	3.80	3.95	4.10	....	....	....	....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	....	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis	3.85	....	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	4.05	....	....	4.30	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	4.00	....	....	4.30	....	4.05	4.05	3.75	....	....	....	....	....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	6.60	9.55	8.55	10.55	9.55
San Francisco†	4.55	7.05	6.10	4.50	....	4.65	4.35	3.95	6.80	9.80	8.80	10.80	9.80
Seattle†	4.65[7]	....	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	9.90	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations. * 12 gage and heavier, $3.43. †Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

ZINC IN WAR

Zinc Coated Steel Cables for Barrage Balloons

ADEQUATE GALVANIZING REQUIRED

The standard for U. S. Army and Navy purchases is *the best available*—and that is as it should be. Not only do our fighting forces deserve the best in performance, but quality insures obtaining full value for every war dollar. Typical of this economy are those war applications of iron and steel which involve corrosion problems. In such cases, *adequate* galvanizing (zinc coating) is required—because scant galvanizing wastes zinc, time and money.

The U. S. Bureau of Standards (Circular 80) states that zinc is "by far the best" protective metallic coating for the rust-proofing of iron and steel. Because zinc is above iron in the electromotive series, corrosion will attack zinc first, thereby protecting the iron from rust. Even though iron or steel is exposed in small areas such as at cut edges, in a protective coating, it is not corroded—if that coating is zinc.

Galvanizing serves the war program in many ways. Illustrated above and below are the all-important *galvanized steel cables on a barrage balloon*, and a few other typical examples of war galvanizing are shown in the background of this page: (1) portable steel landing field, (2) corrugated iron bomb shelter, (3) merchant marine wire rope hoist, (4) wire netting for camouflage. Not illustrated is the all-important zinc-coated pipe on ships.

It is the job of the zinc industry to see that sufficient zinc is available to provide *adequate* galvanized coatings for all-important war applications. This is a major reason why civilian users of metal and pigment may not be able to obtain all of the zinc they would like to have.

10 GALVANIZING

1 HULL PLATES

2 RUBBER

3 PAINT

4 BRASS

5 CERAMICS

6 DIE CASTING

7 PHARMACEUTICALS

8 METAL SPRAYING

9 STAMPING DIES

FOR VICTORY BUY UNITED STATES WAR SAVINGS BONDS STAMPS

THE NEW JERSEY ZINC COMPANY

MANUFACTURERS OF THE FAMOUS HORSE HEAD ZINC PRODUCTS

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall
(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
	$	$	$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	60-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$36.00
Domestic, 26 to 28%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon	$113.00*
2.50 carbon	118.00*
2 carbon	123.00*
1 carbon	133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

FLUORSPAR

Fire Clay Brick	*Per Net Ton*
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00
Foreign, 85% calcium fluoride, not over 5% Ci, c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 95 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$34.00
As above, in bags, f.o.b. same mines	36.40

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	51.30
First quality, New Jersey	56.00
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania	$51.30
Chicago District	58.90
Birmingham	51.30
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard, f.o.b. Baltimore, Plymouth Meeting and Chester	$54.00
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester Pa.	54.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	$76.00
Chemically bonded, f.o.b. Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Foreign Ores**

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

	Per Unit
African, 46-48 Mn	70c.-75c.
Indian, 48-50 Mn	75c.
Brazilian, 46-48 Mn	81c. to 83c.
Cuban, 51 Mn	85c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$24 to $26
Tungsten, domestic scheelite, at mine	$24 to $25
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)	$28 to $30
Rhodesian, 45	Nom.
Rhodesian, 48	Nom.

*Importations no longer readily available. Prices shown are nominal.

COKE*

Furnace

	Per Net Ton
†Connellsville, prompt	$6.00

Foundry

†Connellsville, prompt ..... $6.75 to $7.00

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. †F.O.B. oven.

By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

FUEL OIL

No. 6 Bur. Stsd., del'd Chicago	4.75c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 5 indus., del'd Cleveland	5.25c.
No. 6 indus., del'd Cleveland	5.25c.